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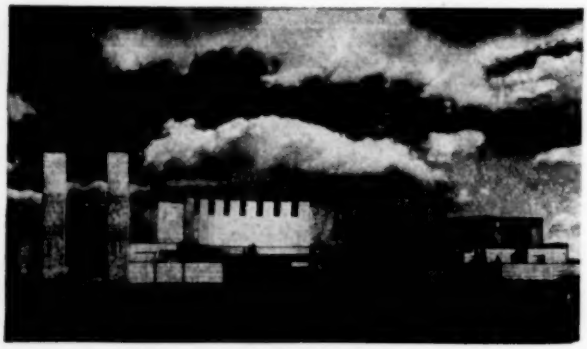

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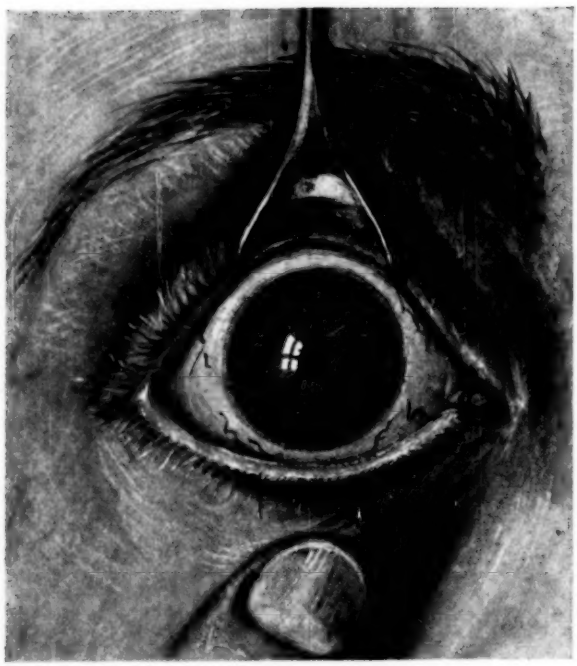

FIG. 1. (DUNNAVAN AND MOTTO)
KAYSER-FLEISCHER RING IN WILSON'S DISEASE. (THE ILLUSTRATION VIEWED THROUGH AN ORDINARY HAND READING LENS GIVES A TRUER IDEA OF THE COLOR.)

AMERICAN JOURNAL OF OPHTHALMOLOGY
VOLUME 16 JULY, 1933 NUMBER 7

KAYSER-FLEISCHER RING IN WILSON'S DISEASE

Report of a case

FLOYD L. DUNNAVAN, M.D., AND M. PAUL MOTTO, M.D.
CLEVELAND

This case is of unusual interest, for the Kayser-Fleischer ring, which may serve to differentiate Wilson's disease from chronic encephalitis, was present in this patient, a girl of fourteen years, who two years previously had been treated for encephalitis. The familial feature was not in evidence in this instance. From the Department of Ophthalmology, University Hospitals, and Western Reserve University School of Medicine.

In ophthalmological consultation at the Babies' and Children's Hospital, we recently had the opportunity to observe and follow the case of a young girl, showing the Kayser-Fleischer ring of corneal pigmentation evidenced in Wilson's disease, or progressive hepatolenticular degeneration. From the ophthalmic standpoint, citations of cases are somewhat limited in number. Reports of cases by various neurologists, however, are more numerous, but in only a few instances do their articles mention the corneal pigmentation associated with the other signs and symptoms of Wilson's disease. The unfamiliar nature of this phenomenon, together with the possibility of the conditions escaping one's attention, may be in part responsible for the relative infrequency of its reported occurrences. Although this case manifested the usual clinical features of the disease, we felt that on the basis of its rarity it merited presentation, together with a review of the literature.

The Kayser-Fleischer ring received its name from the two men who first described the condition. This phenomenon is one of the important symptoms of Wilson's disease and is of great diagnostic value in differentiating this disease from others of a similar nature. It is found in a majority of the cases, but some of the cases reported as Wilson's disease do not present this ocular finding.

The Kayser-Fleischer ring consists of a narrow band or zone of pigmentation at the limbus of the cornea. The condition may be unilateral, but is usually bilateral. The ring may be partial or complete, forming a concentric band around the periphery of the cornea. The diameter of the ring is variable, but the average is approximately two millimeters. The color is usually described as a brownish-green, presenting a more or less smoky hue when viewed with the naked eye. Upon examining the ring with the Zeiss loupe from the outer periphery inwards, it is found that the intensity of the pigmentation increases towards the center, forming a deeper, concentrated band of color. Towards the inner periphery, the color gradually fades, merging into normal transparent cornea. Examination with the loupe discloses the fact that the pigmentation is deeply situated. For a more accurate determination as to the exact situation of the pigmentation, it is essential to resort to the corneal slitlamp, which reveals that the pigmentation is in Descemet's membrane and consists of dark brown granules.

The clinical findings are substantiated by histological study. Hall[1] reported that "The sections showed that the pigment was situated in Descemet's membrane immediately under the cubical epithelium which covers it. It consists of fine granules, very dense, blackish-brown, and much finer than the pigment grains of the pigment epithelium of the retina. They are uniformly distributed immediately under the endo-

thelial covering and do not always fill Descemet's membrane throughout its entire thickness. Thus, outside the pigment there may be seen sometimes a narrow zone free from pigment, where the usual homogeneous and structureless appearance of the membrane persists."

No one has as yet satisfactorily proved the chemical composition of the pigment granules. The nature of the pigment has been studied by Fleischer and Rumpel, as quoted by Koby[17]. Rumpel holds that it is a silver compound, while Fleischer is less positive. It is insoluble in ether, chloroform, alcohol, xylol, acids, and alkalis; but is soluble in a solution of ammonium sulphide. It does not give the Prussian blue reaction nor that of Gmelin, and is not decolorized by hydrogen peroxide. Hall[1] states that the pigment does not give the reaction for iron. He compares it with malarial pigment and thinks it is derived from hemoglobin. Kubik, also quoted by Koby[17], claims that the pigmentation has the likeness and behavior of bilirubin.

Poe[2], in a brief review of Salzmann's book on the histology and staining qualities of the corneal tissues, states "The question of what biochemical processes occur in this disease and produce the changes in the media of the eye remains as unanswered as when the condition was first observed. Toxic substances resulting from a breakdown of the liver tissues are swept into the fluid media of the body and may have a tendency to raise the icteric index. These may be irregularly produced and occur in the minutest quantities. When these toxic substances are secreted into the aqueous humor and remain in contact with the tissues in question anteriorly and posteriorly, a biochemical reaction may take place with Descemet's membrane for which tissue they perhaps have a predilection, thus ultimately resulting in what is clinically known as the Kayser-Fleischer ring."

In 1912, Wilson[8] published his excellent monograph entitled "Progressive lenticular degeneration, a familial nervous disease associated with cirrhosis of the liver." He referred to this condition as a disease which occurs in young people and is often familial, but not congenital or hereditary. It is essentially and chiefly a disease of the extrapyramidal motor system and is characterized by involuntary movements, usually in the nature of tremor, dysarthria, dysphagia, muscular weakness, spasticity, and contractures, with progressive emaciation. With these there may be associated emotionalism and certain symptoms of a mental nature. It is progressive, and after a longer or shorter period fatal. Pathologically, it is characterized predominantly by bilateral degeneration of the lenticular nucleus and cirrhosis of the liver, the latter morbid condition rarely if ever giving rise to symptoms during the life of the patient. Wilson thought that in connection with the hepatic cirrhosis a toxin was probably generated which exerted a selective action on the cells and fibers of the lenticular nucleus.

In 1902, Kayser[4] first described the ring of corneal pigmentation contending that it was a congenital disease. In 1903, Fleischer[5] reported the case of a young man, subject to symptoms regarded as those of disseminated sclerosis. His description of the case included the finding of a greenish pigmentation of the cornea. The pathological report[6] recorded the nervous system as negative, the liver cirrhotic, and the spleen enlarged. In 1912, in a paper entitled "On a hitherto unknown disease related to pseudosclerosis," Fleischer[7] gave a more detailed account of this case.

In the cases reported by Voelsch[8], Wilson[8], Sawyer[9], Auer[10], and Nammack[11], no mention was made of corneal pigmentation. Nammack's case differed from that of Wilson's in the absence of cirrhosis of the liver, which Wilson is inclined to insist upon as a necessary accompaniment of the condition. In Cadwalader's[12] case report (1915) the eyes were reported as negative.

In 1922, Jendralski[13] reported his examination of a family of seven children, four showing the typical Kayser-Fleischer ring. Two had pronounced symptoms of Wilson's disease, and a

third, on autopsy, showed the usual liver degeneration. His slitlamp report described the deep layers of the cornea as showing brown spots, more decided at the periphery with a fine granular sheen to Descemet's membrane. Microscopic examination showed fine greenish-black lines consisting of gray-black granules in front of Descemet's membrane.

Siemerling and Oloff[14], in 1923, reported the case of a man, aged 43 years, suffering from Wilson's disease and possessing a greenish-brown circular opacity, about two millimeters from the periphery, in the deepest layers of the cornea. Nayrac[15], also reported the case of a girl, aged 19 years, without corneal pigmentation. He intimated the possibility of congenital syphilis as an etiological factor in the development of Wilson's disease.

Greenfield, Poynton, and Walshe[16], published an excellent article in 1924. Their case was that of a girl, with onset of symptoms at the age of 14 years, following a trivial injury to one foot. The periphery of the cornea showed a zone of greenish haziness. At autopsy, microscopic examination revealed that the pigmentation was due to the presence of fine brown granules in Descemet's membrane at the periphery of the cornea. The liver showed a profound atrophic multilobular cirrhosis and the brain showed the characteristic findings of Wilson's disease.

Koby[17], in 1925, urged the necessity of a differential diagnosis between the Kayser-Fleischer ring and the ring resulting from pseudoclerosis.

In the case reported by Wahl[18] in 1926, the eye examination revealed heterochromia of each iris. On examination with the loupe the appearance of a fine peripheral greenish reflex from the overlying cornea was observed. In the same year Pretori[19] recorded a case of hepatolenticular degeneration in which both eyes showed a fine brown pigmentation in the surface layers of the corneal limbus, diminishing toward the center.

Pollock and Barborka[20], in 1928, observed a case of two years' duration in a girl, aged 26 years. The liver and spleen were both enlarged. Neither a golden glow from the iris nor the Kayser-Fleischer ring in the cornea were seen upon slitlamp examination.

In the case reported by Barnes and Hurst[21], in 1929, there was no mention of corneal pigmentation. They suggested that the term "hepatolenticular degeneration" be adopted, as it indicates that the lenticular lesion is a sequel to the hepatic injury, and is progressive in character. They also mentioned that two views have been considered regarding the etiology of the disease; namely, the lesion is an expression of a congenital defect of the nervous system, or it is acquired and probably toxic in nature.

Holloway and DeLong[22], in 1929 also, cited the case of a woman, aged 34 years, presenting the usual symptoms of the disease. On ophthalmological examination with the naked eye there was observed a greenish-brown or smoky discoloration at the limbus of both eyes. With the loupe these discolorations appeared as smoky crescents above and below, extending in the right eye from the region of the "10:30 to the 2:00 o'clock" position, and from "4:00 to 8:30 o'clock." In the left eye it extended from "9:30 to 2:00 o'clock," and from the region of "4:00 to 8:30 o'clock." Its greatest width of about two millimeters was in the vertical meridian. The pigmentation was noted as deep, but its exact position could not be determined. Examination with the slitlamp disclosed the involvement of Descemet's membrane.

The most recent and, comparatively, most complete study of this disease was made by Poe[2], in 1930. His patient was a man of 21 years, whose case he had under observation for a period of two years. Upon external examination of the eyes slight nystagmoid jerks were noted at times. A circular brownish-green pigmented area extended around the cornea at the limbus. Slitlamp examination disclosed the pigment in the deep layers of the cornea of a dense brownish-green at the limbus, fading toward the central part. The pigmentation was about 2.5 millimeters broad, not entirely homogeneous, and showed

evidence of granulation. The pupils were somewhat sluggish in reaction, the media clear, and the fundi normal.

Poe had found no previous reference made to vesticular nerve changes in hepatolenticular degeneration. His patient, however, showed the vestibular reactions to be definitely increased above normal. In conclusion, he stated "Although the clinical symptoms of this disease are very similar to those found in chronic encephalitis, and often the presence of a cirrhotic liver cannot be definitely established, the existence of the Kayser-Fleischer ring can be relied upon for a differential diagnosis in Wilson's disease."

Case report

The patient, H. W., white, female, aged 14 years, was admitted to Babies' and Children's Hospital on March 4, 1932, with the following complaints: lack of appetite, retarded and laborious speech, and inability to walk or sleep well.

The patient had been under treatment for encephalitis from July 29, 1930, to October 25, 1930. Since her eighth year she had displayed an intermittent tremor of the hands, as well as some difficulty in eating, and an inability to talk plainly. No history of previous illness or accidents was reported.

The family history was irrelevant. The patient was the fourth child in the family.

It was believed that there had been some improvement in the child's condition upon her discharge from the hospital in 1930. However, two months later the parents claimed that her condition was the same as prior to hospitalization. Her walking became decidedly worse and she was unable to get around the room without assistance. At approximately the same time, she began to lose control of the finer movements of her hands and arms, gradually becoming practically bedridden, and able to walk only with a spastic, shuffling gait. Speech became muffled and only occasionally comprehensive. There was great difficulty in swallowing, and her diet was limited to liquids. On the whole a general wasting process had set in. She had been happy, scarcely ever becoming irritable or cross, and it was impossible to elicit any emotional instability.

Examination showed a well-developed, but undernourished white female, of 14 years, who lay quietly in bed with a smile on her face.

Skin. Brown, discrete, cloasmoid lesions over the lower portion of the abdomen, pubic region, and buttocks.

Eyes. (See ophthalmological report).

Throat. The posterior pharynx and pillars were injected and edematous.

Heart and Lungs. Negative.

Abdomen. Liver dullness was decreased on the right, so that the lower border of the liver was up almost an interspace and a half. The spleen was not palpable.

Extremities. Athetoid movements of the hands and fingers were present, with spasticity. When standing on the floor, the patient was rigid, and had to be held or partially braced. Her gait was described as of a quick, staccato, shuffling, spastic type.

Neuromuscular System. The entire body showed a decided increase in the muscular tonicity with a "lead-pipe" rigidity. The reflexes were definitely decreased. Finer movements and coordination were grossly impaired.

Laboratory Findings. Averaged Hb. 90 percent: Wbc. 3,300: P. 50 percent: Large monos. 28 percent: Small monos. 11 percent: Eos. 11 percent. Tuberculin test negative, 1:10 dilution. Spinal fluid showed only albumen. Blood and spinal fluid Wassermann reactions were negative. Sugar-tolerance test showed a low tolerance. Sugar was present in the urine on several occasions. Bacteriological examination for B. abortus was negative. Liver function tests showed a slight bromsulphalein retention.

Hospital Course. The patient was spastic throughout the entire course. She had febrile periods with undulant waves lasting several days. Aphasia was marked, as well as increasing difficulty in swallowing. During the course of hospitalization she developed an acute suppurative thyroiditis for which incision and drainage were necessary. The patient died May 28, 1932.

Permission for an autopsy was refused.

Ophthalmological Report. External examination revealed a circular band of dull olive-green pigmentation, extending around the cornea at the periphery (figure 1). The band was about 2.5 mm. broad, with a line of deeper, concentrated color running through the center. This formed a definitely darker ring within the band of olive-green pigment, fading toward the periphery and toward the central corneal area which was normal. Examination with the loupe revealed that the pigmentation was in the deeper layers of the cornea. Slitlamp examination disclosed that the pigmentation was confined to Descemet's membrane and consisted of brownish granules. The pupils were equal, regular, and reacted normally to light and convergence. The lens and vitreous were clear. The disc was hazily defined to the nasal side, with decided pallor at the temporal side. The arteries were sclerosed; the veins normal. Both eyes presented practically the same condition except that the right was somewhat more involved. The condition of the eyes remained unchanged during the entire period of observation.

Discussion

As formerly stated by Poe[2], the clinical symptoms of this disease are very similar to those found in chronic encephalitis, but the existence of the Kayser-Fleischer ring can be relied upon for a differential diagnosis in Wilson's disease. We find this observation of decided interest as our patient had been treated for encephalitis two years prior to hospitalization. At the time of her last admission, however, she presented all the clinical features of Wilson's disease and her condition was diagnosed as such.

Summary and conclusions

The Kayser-Fleischer ring of corneal pigmentation is an important symptom of Wilson's disease, and is of special significance from the standpoint of differential diagnosis. This phenomenon consists of a narrow zone of pigmentation composed of brownish granules; the ring averages two millimeters in diameter; it is situated at the corneal limbus, and is confined to Descemet's membrane. The pigmentation of the central area is found to be deeper and more concentrated, forming a definitely darker zone. The underlying disease with which the Kayser-Fleischer ring is associated usually occurs in young people, is often familial, and is essentially an affliction of the extrapyramidal motor system. Etiologically, the whole syndrome may be an expression of a congenital neurological defect, or it may, on the other hand, be an acquired and probably toxic disorder of this and other systems. Pathologically, it is characterized by bilateral degeneration of the lenticular nucleus and cirrhosis of the liver.

We are greatly indebted to Dr. Henry J. Gerstenberger, Director of Pediatrics, Babies' and Children's Hospital, and to Dr. W. E. Bruner, Director of Ophthalmology, Lakeside Hospital, for their kindness in permitting us to present this case report.

650 Rose building.

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CRITICAL VALUES FOR THE LIMITS OF THE COLOR FIELDS IN THE EIGHT PRINCIPAL MERIDIONAL QUADRANTS TAKEN SEPARATELY

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Emmetropic and hyperopic subjects have the widest limits in the eight meridional quadrants considered separately, the myopic the next widest, and the presbyopic the narrowest, this ranking being constant for the three colors; namely, the 1-degree blue, red, and green of the Heidelberg series of colored papers. From the Research Laboratory of Physiological Optics, Wilmer Ophthalmological Institute, Johns Hopkins Medical School, and from the Graduate School of Medicine, University of Pennsylvania, Philadelphia.

In a former paper[1] diagnostic scales were given for the limits of the form field in the eight principal meridional quadrants taken separately for stimuli subtending 1 degree and 0.17 degree at the eye. In this paper will be published in an abbreviated form the results of a similar study for the color fields.

It was pointed out in the former paper that just as there is a normal range of variation in size of field, so there is also a normal range of variation in shape of field; that for shape as well as for size, a scale or standard of reference is needed for diagnosis and the classification of cases; and that while shape can not be conveniently expressed in numerical terms, scales showing the range and distribution of variation of breadth of field can be constructed for as many meridians as are desired. With scales of this kind the results in each new case examined can be compared meridian by meridian with the results from a normal group of observers and a very definite and detailed idea obtained as to whether or not the shape of the field in question falls within the normal range of variation.

With reference to the limits of the form and color fields the following comparisons all present diagnostic possibilities: (a) area of field or average breadth of field in a selected number of meridional quadrants; (b) breadth of field in the meridional quadrants taken separately; (c) proportionality, difference, or percentage difference in the average breadth of field and breadth in the meridional quadrants taken separately, for certain stimuli selected on the basis of results obtained in a study of pathologic cases; (d) difference or percentage difference in selected meridians with the same stimulus; and (e) difference or percentage difference in the two eyes. Scales or critical values are needed for all of these points.

In the above connections it may be noted that one of the advantages of the subjective method of examination and one of the reasons for its use as a complementary procedure, is that with it diagnostic scales may be used as the statistical measure of normalcy and the results obtained can be subjected more or less satisfactorily to numerical treatment and comparison. No method has as yet been devised, for example, for conveniently expressing or formulating the range of normal variation in the appearance of the fundus. Obviously in arriving at a conclusion in diagnosing by the objective method of examination, more has to be left to the judgment and accumulated experience of the examiner. While it may be said that a considerable amount of background and training is required for the successful use of the subjective method of examination, the fact remains that on the whole less maturity of judgment and experience is required than when the objective method is used. This is, in part,

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due to the fact that no means has yet been devised or at least rendered generally available for making a definite record or expression of the results that are obtained with the objective method of examination. The diagnosis must be made by the medical examiner or by an examiner trained in diagnosing, and for that reason the work of making the examination can not be entrusted to a technician. On the other hand the results obtained by the subjective method can be so definitely recorded in terms that are more or less satisfactorily quantitative that the examination itself may be more safely entrusted to a well-trained, nonmedical technician and only the interpretation of the results be reserved for the diagnostician.

It may be further noted that one of the important reasons for the inspection of the results for the individual meridional quadrants taken separately in comparison with a scale showing the range of normal variation, is the ready indication from the routine examination that may thus be obtained of cuts and irregular indentations in the field. With this indication as a guide, corroborated by a comparison with the values given in the scale, a more detailed outline of the field can be made in the region affected by a delineation of the limits in a greater number of meridians. Important data which might otherwise have been overlooked may thus become available.

Conditions under which the work was done

The limits were determined on a Ferree-Rand perimeter with a strict observance of all the precautions prescribed for the use of this instrument. With this perimeter all the external conditions of the test can be held constant and reproduced at will. The illumination at every point in the field was kept constant at 7 foot candles. The values determined, it must be remembered, are valid only for this perimeter when used under these conditions.

The stimuli employed were made from the red, blue, and green Heidelberg standard pigment papers. The backgrounds and the preëxposure cards were in each case of gray of the approximate brightness of the colors at the limits of their visibility in the field. These grays are provided with the perimeter. Their coefficients of reflection are: for red and blue 11.4 percent, and for green 39.5 percent. The brightnesses of these screens when illuminated with 7 foot candles of light are respectively 0.00177 and 0.00613 candle power per square inch. As has been demonstrated in former papers, it is very important in the determination of the color fields to have a constant illumination of the stimulus and no difference in brightness between it and the surfaces which serve as preëxposure and surrounding field. This latter control, it will be remembered, accomplishes three purposes: (a) it eliminates all variable effects due to brightness afterimage and to brightness induction from the surrounding field on the power of the retina to respond to color; (b) it renders the judgment of the limit more certain and easier to make since at the limit of sensitivity the stimulus becomes indistinguishable from the background when the background is of the same brightness as the color; and (c) the use of the preëxposure method for the final determination of the limit is also an essential aid to securing a good control of fixation at the moment the judgment is made. Its use is very much worthwhile for this purpose alone in determining the limits both of the form and the color fields. In this connection it will be remembered that our recommendation is that the limit first be roughly located by the moving-stimulus method and then its exact location be determined with a stationary stimulus and a preëxposure. In making the preëxposure for color the stimulus is covered with a gray card of the brightness of the color and the observer is directed to take his fixation. When this is done a preparatory signal, "Ready," is given, followed one second later by "Now" or some other suitable indication. At the word "Now" the stimulus is exposed for approximately one second and again covered. If the stimulus is not seen, it is moved a little nearer the center and the procedure

noted above is repeated. This is continued until a point is reached at which the stimulus is seen. Conversely, if on the first exposure the stimulus is seen it is moved a little farther from the center and the procedure repeated until a point is reached at which it is not seen. The farthest point from the center at which the stimulus is seen is accepted as the limit of the field.

One size of stimulus, 5.8 mm., was used for each of the colors. At the distance of the arc of the perimeter from the eye, 33 cm., these stimuli subtend a visual angle of 1 degree. The persons examined included private patients, nurses, assistants on the clinical staff and a large number of clinical patients. In every instance the refractive condition of the eye was carefully determined and an ophthalmoscopic examination made. No cases were included in the series in which a pathologic condition, however slight, was reported. The observers were also required to pass the Ishihara test for color blindness. Ample rest periods were allowed between examinations, and care was exercised that no field was taken when the observer was suffering from general fatigue or was otherwise unfit for accurate work. All determinations were checked, but the observer was not given extensive preliminary training. It was not our purpose to make the examinations for the determination of scales of reference under conditions differing in this respect for those which obtain in the ordinary practice of perimetry. The results may therefore be considered a fair sample of what may be expected in an average group of untrained observers who show no pathologic disturbances.

The limits were determined in eight meridional quadrants: 0, 45, 90, 135, 180, 225, 270, and 315 degrees. In determining scales for the color fields it was our purpose to use as far as possible the same observers that were used in obtaining the norms for the form fields. For various reasons, however, not all of these observers were available.

The limits for red, blue, and green were determined for 150 eyes[2]. In this group were included 55 cases of hyperopia, 29 cases of myopia, 22 cases of presbyopia, 5 cases of mixed astigmatism, and 39 cases which showed no error of refraction at all or an error no greater than one diopter of hyperopia or 0.25 diopter of hyperopic astigmatism. The latter group contained no case of myopia or of myopic astigmatism of detectable amount. For convenience it will be referred to as emmetropic. There were in this group 54 males and 96 females. The range of age was from eight to fifty-five years.

Results

A representation of the results is given in tables 1 to 6 and in figures 1 to 6. Because of the amount of space that would be required, the diagnostic scales which we have plotted from these data will not be included in this paper. They have been used, however, in drawing the conclusions that are given and in selecting the critical values for the limits.

In tables 1 to 3 are shown for the total number of cases and for the different refraction groups when each meridional quadrant is considered separately: (a) the limiting values of the fields, widest and narrowest; (b) the average value; (c) the median or middle value; (d) the

[2] It will be understood from our first paper on diagnostic scales (Studies in Perimetry. I. Preliminary work on a diagnostic scale for the form field. Amer. Jour. Ophthal., 1926, v. 9, pp. 95-104) that we do not regard the number of cases used as completely adequate for the determination of final critical values. The values which we have presented, however, have been found to serve a very useful and practical purpose in diagnosis. A number of scales are needed not only in perimetry but for the light sense and other visual functions. The amount of work involved in compiling scales for all these functions which would be considered statistically complete would be prohibitive for a small group of workers. We have felt, therefore, that a greater practical service can be rendered by covering the wider field than by determining a very few scientifically correct distribution curves. Moreover, it is obvious that the scales presented can be added to by other examiners as the opportunity may arise. Further, the scales of this type however meticulously determined, can not be applied with scientific rigor in the practical work of diagnosing. Also the problem of forming these scales is not entirely that of determining distribution curves for normal observers.

Table 1

FOR THE 1-DEGREE *BLUE* STIMULUS IN EACH MERIDIONAL QUADRANT FOR THE ENTIRE GROUP AND FOR EACH REFRACTION GROUP: (a) THE LIMITING VALUES OF THE FIELDS, WIDEST AND NARROWEST; (b) THE AVERAGE VALUE; (c) THE MEDIAN OR MIDDLE VALUE; (d) THE MEDIAN-DEVIATION EXPRESSED IN DEGREES; AND (e) THE MEDIAN-DEVIATION EXPRESSED AS A PERCENTAGE OF THE MEDIAN.

Meridional Quadrant, Degrees	Refraction Group	Limiting Values, Degrees	Range, Degrees	Average Limit, Degrees	Median Limit, Degrees	Median-Deviation	
						Degrees	Percent
0 (Temporal)	Emmetropia..	54–78	24	64.3	64.0	4.0	6.3
	Hyperopia....	52–78	26	64.6	64.0	5.0	7.8
	Myopia.....	45–78	33	60.8	60.0	6.0	10.0
	Presbyopia...	44–70	26	54.0	52.0	5.5	10.6
	Entire group..	44–78	34	62.0	62.0	5.5	8.9
45 (Upper temporal)	Emmetropia..	30–56	26	42.9	43.0	4.0	9.3
	Hyperopia....	30–59	29	43.4	44.0	3.5	8.0
	Myopia.....	24–62	38	39.2	39.0	5.5	14.1
	Presbyopia...	28–45	17	34.6	34.5	3.5	10.1
	Entire group..	24–62	38	41.0	41.0	4.5	11.0
90 (Upper)	Emmetropia..	25–46	21	33.2	32.0	3.5	10.9
	Hyperopia....	20–49	29	33.3	33.0	3.0	9.1
	Myopia.....	18–48	30	29.1	29.0	4.0	13.8
	Presbyopia...	21–39	18	27.4	26.5	5.5	20.8
	Entire group..	18–49	31	31.3	31.0	3.5	11.3
135 (Upper nasal)	Emmetropia..	28–51	23	37.9	37.0	4.0	10.8
	Hyperopia....	24–49	25	36.5	36.0	3.5	9.7
	Myopia.....	20–56	36	35.0	35.0	5.0	14.3
	Presbyopia...	22–46	24	30.9	30.0	3.0	10.0
	Entire group..	20–56	36	35.5	35.0	4.5	12.8
180 (Nasal)	Emmetropia..	30–54	24	41.8	42.0	5.0	11.9
	Hyperopia....	30–56	26	40.9	39.0	4.5	11.5
	Myopia.....	29–58	29	39.4	40.0	6.5	16.3
	Presbyopia...	28–47	19	35.8	35.0	4.5	12.8
	Entire group..	27–58	31	40.3	39.0	5.0	12.8
225 (Lower nasal)	Emmetropia..	28–53	25	40.9	42.0	4.5	10.7
	Hyperopia....	26–52	26	39.0	39.0	4.0	10.3
	Myopia.....	24–52	28	37.0	38.0	4.5	11.8
	Presbyopia...	24–45	21	34.4	35.0	5.0	14.3
	Entire group..	24–53	29	38.3	38.0	4.0	10.5
270 (Lower)	Emmetropia..	31–50	19	42.1	41.0	5.0	12.2
	Hyperopia....	25–56	31	41.9	43.0	4.5	10.5
	Myopia.....	29–56	27	39.2	37.0	5.5	14.9
	Presbyopia...	23–51	28	37.5	37.0	10.0	27.0
	Entire group..	23–56	33	40.6	40.5	5.5	13.6
315 (Lower) temporal)	Emmetropia..	41–72	31	52.6	51.0	6.5	12.7
	Hyperopia....	42–72	30	53.7	53.0	5.0	9.4
	Myopia.....	35–78	43	51.7	50.0	6.5	13.0
	Presbyopia...	30–60	30	46.1	45.5	6.0	13.2
	Entire group..	30–78	48	51.7	51.0	6.5	12.7

median-deviation[3], expressed in degrees; (e) the median-deviation expressed as percent of the median. These data are given for the 1-degree blue stimulus in table 1, for the 1-degree red stimulus in table 2 and for the 1-degree green stimulus in table 3. An inspection of the median-deviations and the per-

[3] The median-deviation, as a measure of variability or scatter, represents the median or middle of the deviations from the median values in the scale. It specifies a range on either side of the median within which is included twenty-five percent of the total number of cases.

centage median-deviations for the various meridional quadrants offers a numerical comparison of the scatter or dispersion of the individual results for each quadrant about its median value.

The results represented in these tables may be summarized as follows:

(1) In general the emmetropic and hyperopic subjects have the widest limits in the eight meridional quadrants considered separately, the myopic the next widest, and the presbyopic the narrowest. This ranking holds for all three colors. However, the reduction in the extension of the limits for the myopic eyes as compared with the emmetropic

Table 2

FOR THE 1-DEGREE *RED* STIMULUS IN EACH MERIDIONAL QUADRANT FOR THE ENTIRE GROUP AND FOR EACH REFRACTION GROUP: (a) THE LIMITING VALUES OF THE FIELDS, WIDEST AND NARROWEST; (b) THE AVERAGE VALUE; (c) THE MEDIAN OR MIDDLE VALUE; (d) THE MEDIAN-DEVIATION EXPRESSED IN DEGREES; AND (e) THE MEDIAN DEVIATION EXPRESSED AS A PERCENTAGE OF THE MEDIAN

Meridional Quadrant, Degrees	Refraction Group	Limiting Values, Degrees	Range, Degrees	Average Limit, Degrees	Median Limit, Degrees	Median-Deviation	
						Degrees	Percent
0 (Temporal)	Emmetropia	52–76	24	61.1	60.0	6.0	10.0
	Hyperopia	42–76	34	59.7	60.0	7.0	11.7
	Myopia	40–77	37	59.1	58.0	6.5	11.2
	Presbyopia	32–67	35	50.1	50.0	8.0	16.0
	Entire group	32–77	45	58.2	58.0	6.5	11.2
45 (Upper temporal)	Emmetropia	25–57	32	38.1	38.0	5.0	13.2
	Hyperopia	23–57	34	37.6	37.0	4.0	10.8
	Myopia	12–57	45	35.2	34.0	6.5	19.1
	Presbyopia	16–45	29	29.8	28.0	5.5	19.6
	Entire group	12–57	45	35.9	36.0	6.0	16.7
90 (Upper)	Emmetropia	20–45	25	29.4	30.0	4.0	13.3
	Hyperopia	19–49	30	29.5	30.0	4.0	13.3
	Myopia	14–48	34	27.2	26.0	5.5	21.1
	Presbyopia	13–34	21	23.6	24.0	4.5	18.7
	Entire group	13–49	36	27.9	28.0	4.5	16.1
135 (Upper nasal)	Emmetropia	22–49	27	32.4	32.5	4.5	13.8
	Hyperopia	23–50	27	32.4	31.0	4.0	12.9
	Myopia	17–56	39	30.0	28.0	4.75	17.0
	Presbyopia	17–38	21	26.3	26.0	3.5	13.4
	Entire group	17–56	39	30.7	30.0	4.5	15.0
180 (Nasal)	Emmetropia	25–54	29	36.5	35.0	5.0	14.3
	Hyperopia	22–54	32	35.4	33.0	5.0	15.1
	Myopia	24–58	34	35.1	32.0	8.0	25.0
	Presbyopia	22–46	24	31.4	30.0	4.5	15.0
	Entire group	22–58	36	34.6	33.0	5.5	16.7
225 (Lower nasal)	Emmetropia	23–51	28	35.7	34.0	5.0	14.7
	Hyperopia	23–55	32	33.9	33.0	4.5	13.6
	Myopia	22–56	34	32.2	32.0	6.5	20.3
	Presbyopia	19–46	27	28.4	27.0	3.5	13.0
	Entire group	19–56	37	34.0	32.0	5.5	17.2
270 (Lower)	Emmetropia	25–54	29	37.1	35.0	5.5	15.7
	Hyperopia	24–54	30	35.9	35.0	5.0	14.3
	Myopia	25–56	31	35.6	35.0	5.5	15.7
	Presbyopia	18–45	27	29.6	28.5	5.0	17.5
	Entire group	18–56	38	35.0	34.0	5.0	14.7
315 (Lower) temporal)	Emmetropia	31–69	38	47.8	48.0	7.0	14.6
	Hyperopia	27–74	47	45.8	45.0	5.0	11.1
	Myopia	31–72	41	45.8	45.0	8.0	17.8
	Presbyopia	24–58	34	39.0	38.0	5.0	13.2
	Entire group	24–74	50	44.0	44.5	6.5	14.6

Table 3

FOR THE 1-DEGREE *GREEN* STIMULUS IN EACH MERIDIONAL QUADRANT FOR THE ENTIRE GROUP AND FOR EACH REFRACTION GROUP: (a) THE LIMITING VALUES OF THE FIELDS, WIDEST AND NARROWEST; (b) THE AVERAGE VALUE; (c) THE MEDIAN OR MIDDLE VALUE; (d) THE MEDIAN-DEVIATION EXPRESSED IN DEGREES; AND (e) THE MEDIAN-DEVIATION EXPRESSED AS A PERCENTAGE OF THE MEDIAN

Meridional Quadrant, Degrees	Refraction Group	Limiting Values, Degrees	Range, Degrees	Average Limit, Degrees	Median Limit, Degrees	Median-Deviation	
						Degrees	Percent
0 (Temporal)	Emmetropia	30–68	38	42.5	40.0	7.5	18.8
	Hyperopia	11–60	49	38.0	37.0	5.5	14.9
	Myopia	10–58	48	36.2	37.0	12.0	32.4
	Presbyopia	9–50	41	20.5	13.5	12.5	92.6
	Entire group	9–68	59	36.2	37.0	6.5	17.6
45 (Upper temporal)	Emmetropia	13–45	32	26.2	25.0	7.5	30.0
	Hyperopia	12–41	29	23.3	23.0	6.5	28.3
	Myopia	8–44	36	22.8	19.0	12.5	65.8
	Presbyopia	8–35	27	14.4	13.0	3.0	23.1
	Entire group	8–45	37	22.6	22.0	6.5	29.5
90 (Upper)	Emmetropia	12–37	25	20.8	19.0	6.0	31.6
	Hyperopia	10–37	27	19.1	18.0	5.0	27.8
	Myopia	8–32	24	18.1	17.0	7.75	45.6
	Presbyopia	8–28	20	12.5	11.0	4.0	36.4
	Entire group	8–43	35	18.0	17.0	5.0	29.4
135 (Upper nasal)	Emmetropia	14–38	24	23.3	21.0	6.0	28.6
	Hyperopia	12–36	24	21.4	21.0	4.0	19.0
	Myopia	11–35	24	21.4	20.0	9.5	47.5
	Presbyopia	9–32	23	15.3	14.0	2.5	17.9
	Entire group	9–38	29	20.9	20.0	4.25	21.2
180 (Nasal)	Emmetropia	16–46	30	26.8	24.0	6.5	27.1
	Hyperopia	14–40	26	25.3	25.0	4.5	18.0
	Myopia	13–41	28	24.9	22.0	9.5	43.2
	Presbyopia	13–33	20	17.4	18.0	4.0	22.2
	Entire group	13–46	33	24.5	24.0	5.0	20.8
225 (Lower nasal)	Emmetropia	14–43	29	25.2	22.0	7.5	34.1
	Hyperopia	13–39	26	23.0	22.0	4.0	18.2
	Myopia	12–36	24	22.8	20.0	9.0	45.0
	Presbyopia	10–33	23	15.3	14.0	4.0	28.6
	Entire group	10–43	33	21.6	21.0	4.5	21.4
270 (Lower)	Emmetropia	13–46	33	26.2	24.0	6.0	25.0
	Hyperopia	13–46	33	23.4	22.0	3.5	15.9
	Myopia	11–38	27	22.3	20.0	13.5	67.5
	Presbyopia	7–42	35	15.8	14.5	3.0	20.7
	Entire group	7–46	39	22.7	22.0	6.5	29.5
315 (Lower Temporal)	Emmetropia	15–60	45	32.9	30.0	7.0	23.3
	Hyperopia	16–54	38	29.1	27.0	6.0	22.2
	Myopia	12–48	36	27.8	24.0	12.0	50.0
	Presbyopia	9–40	31	17.3	15.5	5.5	35.5
	Entire group	9–60	51	28.0	26.0	7.0	26.9

and hyperopic is the greatest for blue and the least for red; for the presbyopic it is by far the greatest for green. The refractive condition is probably an important factor in the defect of the myopic subjects for blue, and age in the defect of the presbyopic for green.

(2) The scatter or range of variation of results in all meridional quadrants is in general greater with the color stimuli than with the form stimuli previously used, 1-degree and 0.17-degree white on black. This greater scatter is due largely to the greater sensitivity of the color

Table 4

FOR THE 1-DEGREE *BLUE* STIMULUS IN EACH MERIDIONAL QUADRANT AND EACH REFRACTION GROUP: (a) THE NARROWEST LIMIT; (b) THE 5-PERCENTILE LIMIT*; AND (c) THE LIMIT TENTATIVELY CHOSEN AS SUGGESTIVE OF PATHOLOGIC DISTURBANCE

Meridional Quadrant, Degrees	Narrowest Limit, Degrees				5-Percentile Limit, Degrees				Limit Suggestive of Pathologic Disturbance, Degrees		
	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic and Hyperopic	Myopic	Presbyopic
0	54	52	45	44	56	54	45	46	55	46	46
45	30	30	24	28	34	33	28	29	33	28	28
90	25	20	18	21	26	25	20	21	25	21	21
135	28	24	20	22	29	30	25	23	29	25	23
180	30	30	29	28	34	34	29	28	34	29	28
225	28	26	24	24	32	32	28	25	32	28	25
270	31	25	29	23	34	33	30	23	33	30	23
315	41	42	35	30	42	44	38	33	43	38	33

* Largest value in the group which represents the smallest 5 percent of cases.

Table 5

FOR THE 1-DEGREE *RED* STIMULUS IN EACH MERIDIONAL QUADRANT AND REFRACTION GROUP: (a) THE NARROWEST LIMIT; (b) THE 5-PERCENTILE LIMIT; AND (c) THE LIMIT TENTATIVELY CHOSEN AS SUGGESTIVE OF PATHOLOGIC DISTURBANCE

Meridional Quadrant, Degrees	Narrowest Limit, Degrees				5-Percentile Limit, Degrees				Limit Suggestive of Pathologic Disturbance, Degrees		
	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic and Hyperopic	Myopic	Presbyopic
0	52	42	40	32	54	48	45	40	48	45	40
45	25	23	12	16	26	25	22	23	25	23	23
90	20	19	14	13	22	21	17	17	21	17	17
135	22	23	17	17	24	24	23	21	24	23	21
180	25	22	24	22	26	28	25	23	27	25	23
225	23	23	22	19	25	25	22	21	25	22	21
270	25	24	25	18	26	24	27	21	25	25	21
315	31	27	31	24	33	35	32	29	34	32	29

Table 6

FOR THE 1-DEGREE *GREEN* STIMULUS IN EACH MERIDIONAL QUADRANT AND EACH REFRACTION GROUP: (a) THE NARROWEST LIMIT; (b) THE 5 PERCENTILE LIMIT; AND (c) THE LIMIT TENTATIVELY CHOSEN AS SUGGESTIVE OF PATHOLOGIC DISTURBANCE

Meridional Quadrant, Degrees	Narrowest Limit, Degrees				5-Percentile Limit, Degrees				Limit Suggestive of Pathologic Disturbance, Degrees		
	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic	Hyperopic	Myopic	Presbyopic	Emmetropic and Hyperopic	Myopic	Presbyopic
0	30	11	10	9	31	28	10	10	28	10	10
45	13	12	8	8	13	14	10	8	13	10	8
90	12	10	8	8	13	12	10	8	12	10	8
135	14	12	11	9	15	14	12	10	14	12	10
180	16	14	13	13	18	18	16	13	18	16	13
225	14	13	12	10	14	16	13	10	14	13	10
270	13	13	11	7	16	15	12	7	15	12	7
315	15	16	12	9	21	20	13	9	20	13	9

stimuli for the detection of individual differences and is characteristic, so far as we know, of both color and form stimuli of low visibility. Of the colors, the scatter for 1-degree blue is most nearly of the same order of magnitude as that for 0.17-degree white on black.

(3) Judged by the percentage median deviation as a measure, the scatter in all meridional quadrants is least for blue and greatest for green. The scatter for green is so great, particularly in the myopic and presbyopic groups, as to render it probable that a 1-degree green stimulus has little value for diagnosis based on breadth of field in any given meridian.

(4) The scatter is least for all these colors in the 0-degree meridional quadrant (temporal). In this meridional quadrant it is 9 percent for blue, 11 percent for red and 18 percent for green. With this exception there is no consistent region of greater or less scatter for the colors taken collectively as was found to be the case for the form stimuli of high and medium visibility. For red and blue, for example, the scatter is very nearly of the same order of magnitude in the remaining meridional quadrants. For the total number of cases it ranges for blue from 11 to 14 percent and for red from 14 to 17 percent. For green, however, there is less scatter in the meridional quadrants in the nasal half of the field than there is in the upper, the lower, and the two temporal oblique meridians. In the three meridians on the nasal side it is 21 percent. In the remaining meridians, with the exception of the temporal as noted above, it ranges from 27 to 30 percent.

(5) The scatter is in general greatest in the myopic, next greatest in the presbyopic and least in the hyperopic and emmetropic groups. An exception to this occurs in the case of the 0-degree meridional quadrant, in which the presbyopic subjects have a slightly greater scatter than the myopic for red and a very much greater scatter for green. This latter result is in part due to the fact that the limit for green in this meridional quadrant fell between the fovea and the blind spot in more than half the presbyopic group.

A further analysis of the data for the purpose of ascertaining their value in diagnosis is given in tables 4 to 6. As an aid to the examiner in selecting a value that he considers differential, these tables are made to include the following data for each color, respectively: (a) the narrowest limit in each meridional quadrant in emmetropic, hyperopic, myopic, and presbyopic eyes; (b) the 5-percentile limit (i.e., the value below which lie approximately 5 percent and above which, approximately 95 percent of the total number of cases) in each refraction group; and (c) a limit tentatively chosen as suggestive of pathologic disturbance.

Because of the greater range of variation of limits in the different meridional quadrants and particularly because of the large amount of scatter among the cases with narrow limits, the use of color for diagnosis on the basis of breadth of limit presents greater difficulties than the use of form stimuli of high and medium visibilities. A difficulty is presented also by the greater overlapping of the results in the refraction groups. For these reasons the borderline value or the one suggestive of pathologic disturbance can not be chosen as satisfactorily as it was for the form stimuli. In our use of the data for diagnosis during the past four years we have come to feel that too much stress should not be laid on the extremely narrow limits obtained in one or two of the subjects contained in the group. Where there is an excessively wide scatter at the lower end of the scale a fairer estimate of the critical value is frequently provided by the 5-percentile value or some value between the narrowest and the 5 percentile. In selecting the critical values given in the above tables, therefore, this consideration has been kept in mind. Further, in choosing these limits, we have decided to group together the emmetropic and hyperopic subjects both for the sake of simplicity and because the limits which would be chosen for each of these groups are not substantially different. These values which we have called suggestive of pathologic disturbance are given in columns 10 to 12 of tables 4 to 6. However, they represent, it must be remembered, only our tentative selection of the limits that may be taken to indicate pathologic disturbance. It must also be remembered that the authority of any critical value, however well selected, based on a statistical study of groups, is not final. In each case diagnosed, the relation of the values obtained for the limits in the different meridians as well as their absolute value must be taken into account; that is, in a given case in which the greater number of the values

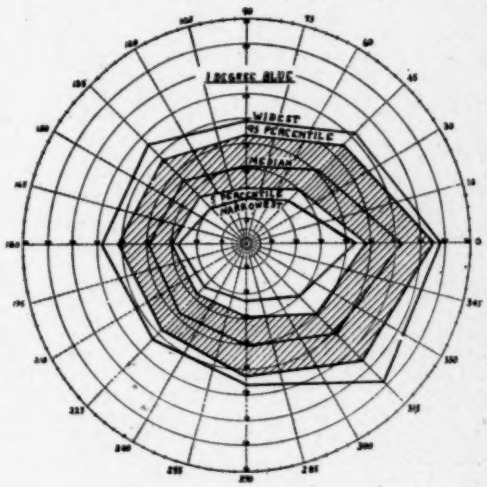

Fig. 1. For the 1-degree blue stimulus the limiting values for the entire group of 150 nonpathologic cases and for the middle 90 percent of these cases. The 90-percent group is shown as a shaded zone. Near the middle of this zone a heavy line represents the position of the median case.

are large, larger values than we have selected for columns 10 to 12 occurring in one or more meridional quadrants may well be considered as warranting suspicion or a placing of the case under observation. We hope later to present a scale showing the normal variation in the relation of the limits to each other in the more significant locations in the field.

In figures 1 to 6 the analysis of the data is continued graphically. In figures 1, 2, and 3 the points representing the limiting values in each meridional quadrant are connected into field maps. It should be remembered, however, that size of field taken as a whole is not the

feature stressed in the treatment of the data given in this paper. In figures 4, 5, and 6 the points are not connected to form a field map.

In figures 1, 2, and 3 are represented for 1-degree blue, red, and green, re-

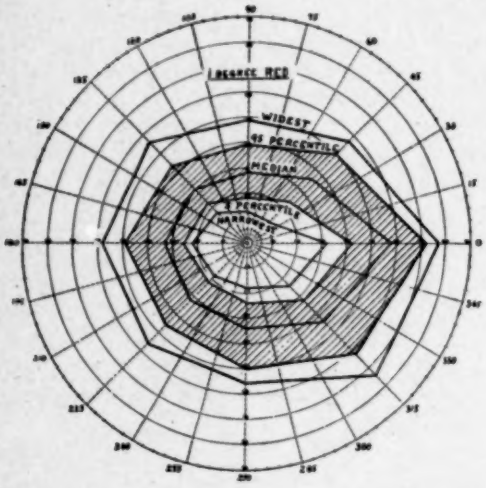

Fig. 2. For the 1-degree red stimulus the limiting values for the entire group of 150 nonpathologic cases and for the middle 90 percent of these cases. The 90-percent group is shown as a shaded zone. Near the middle of this zone a heavy line represents the position of the median case.

spectively, the limiting values for the entire group and for the middle 90 percent of the cases. The 90-percent group is shown as a shaded zone. The inner border of this zone represents the location of the 5-percentile value noted above; i.e., inside this border lie 5 percent and beyond it 95 percent of the cases. Whether or not special significance should be ascribed to the 5-percentile value, it is at least helpful to know that 95 percent of a sample nonpathologic group have limits wider than these and only 5 percent have narrower limits. Near the middle of the 90-percent zone a heavy line indicates the position of the median case.

In figures 4, 5, and 6 are shown for the 1-degree blue, red, and green, respectively, the points that have been selected as representing critical values for the limits. Insofar as a wider examination of pathologic and nonpathologic cases under the controls used in our study justifies the selection, cases showing narrower limits than these should be regarded with suspicion. We would prefer, however, that each examiner study the data presented and himself select the values that he considers critical or differential. In our routine work with clinic cases we have found the scales that we have compiled to be of great value not only as an aid in diagnosing but as indicating regions in the field that should be given further study. With this more-or-less-definite quantitative indication as a guide, cuts in the field and regions of depressed sensitivity which might otherwise have been overlooked, may be outlined by a more detailed study.

Summary

In previous papers diagnostic scales have been published for the form and color fields based on both the area and the average breadth of field in the eight

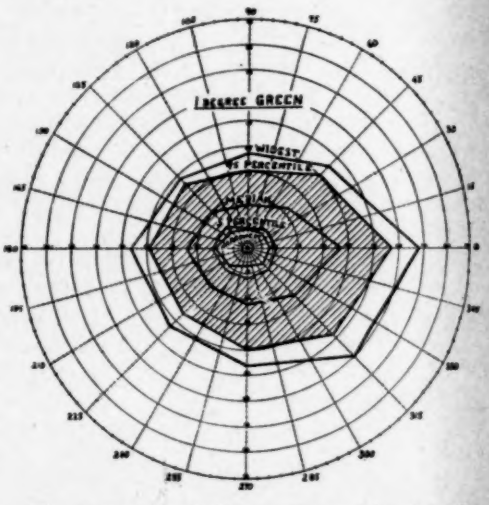

Fig. 3. For the 1-degree green stimulus the limiting values for the entire group of 150 nonpathologic cases and for the middle 90 percent of these cases. The 90-percent group is shown as a shaded zone. Near the middle of this zone a heavy line represents the position of the median case.

principal meridional quadrants. Such scales are serviceable in diagnosis primarily in cases in which the contraction produced by pathologic conditions is more or less regular or in which an irregular contraction is of sufficient mag-

nitude to affect the area of the field or its average breadth. In all other cases scales for the meridians taken separately are needed for a diagnosis based on the limits of the field. In the present paper, data have been compiled separately for the eight principal meridional quadrants (0, 45, 90, 135, 180, 225, 270 and 315 degrees) for the 1-degree blue, red, and green of the Heidelberg series of colored papers. With reference to these data, the following points may be noted briefly in summary:

(1) In general, emmetropic and hyperopic subject have the widest limits in the eight meridional quadrants considered separately, the myopic the next widest, and the presbyopic the narrowest. This ranking holds for all three colors. However, the reduction in the extension of the limits for the myopic as compared with the emmetropic and hyperopic eyes is the greatest for blue and the least for red; for the presbyopic it is by far the greatest for green. The

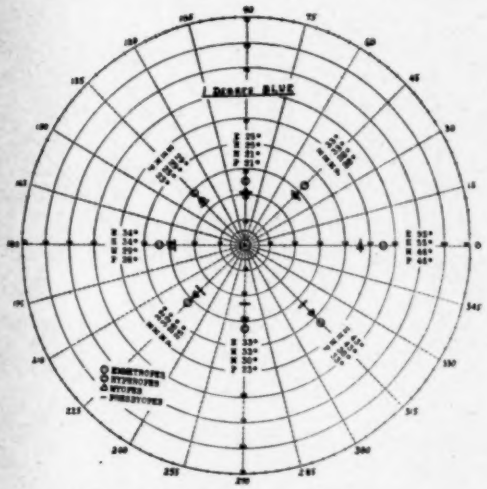

Fig. 4. For each of the eight principal meridional quadrants the point beyond which a contraction of the limit suggests pathologic disturbance. These points are shown for the 1-degree blue stimulus for each of the refraction groups.

refractive condition is probably an important factor in the defect of the myopic eye for blue, and age in the defect of the presbyopic for green.

(2) The scatter or range of variation of results in all meridional quadrants is in general greater with the color stimuli than with the form stimuli previously used, 1-degree and 0.17-degree white on black. This greater scatter is due largely to the greater sensitivity of the color stimuli in the detection of individual differences and is characteristic, so far as we know, of both color and form stimuli of low visibility. Of the colors, the scatter for 1-degree blue is most nearly of the same order of magnitude as that for 0.17-degree white on black.

Fig. 5. For each of the eight principal meridional quadrants the point beyond which a contraction of the limit suggests pathologic disturbance. These points are shown for the 1-degree red stimulus for each of the refraction groups.

(3) Judged by the percentage median-deviation as a measure, the scatter in all meridional quadrants is least for blue and greatest for green. The scatter for green is so great, particularly in the myopic and presbyopic eyes, as to render it probable that a 1-degree green stimulus has little value for diagnosis based on breadth of field in any given meridian.

(4) The scatter is least for all these colors in the 0-degree meridional quadrant (temporal). With this exception there is no consistent region of greater or less scatter for the colors taken collectively as was found to be the case with the form stimuli of high and medium visibility. For red and blue, for example, the scatter is very nearly of the

same order of magnitude in the remaining meridional quadrants. For green, however, there is less scatter for the meridional quadrants in the nasal half of the field than there is for the upper, the lower, and the two temporal oblique meridians.

Fig. 6. For each of the eight principal meridional quadrants the point beyond which a contraction of the limit suggests pathologic disturbance. These points are shown for the 1-degree green stimulus for each of the refraction groups.

(5) The scatter is in general greatest in myopic, next greatest in presbyopic, and least in hyperopic and emmetropic eyes. An exception to this occurs for the 0-degree meridional quadrant in which case the presbyopic subjects have a slightly greater scatter than the myopic for red and a very much greater scatter for green. This latter result is in part due to the fact that the limit for green in this meridional quadrant fell between the fovea and the blind spot in more than half the presbyopic group.

(6) A numerical comparison of the relation between meridional quadrants is a valuable feature in the use of scales compiled for the different meridional quadrants. This is particularly true of all stimuli of low visibility, color and form, because of the greater range of variation or scatter of results with these stimuli; that is, fields that were normally wide might suffer considerable contraction in one or more meridional quadrants and the limit still remain within the normal range of the group. The abnormality would be revealed, however, by a comparison of the place or ranking of these results in the scale with those obtained in the other meridians. In doubtful cases it is also of great value to compare the results with those of the other eye. This is true also in the use of the scales for the area and average breadth of field.

(7) Because of a greater range of scatter of results, stimuli of low visibility, color and form, are of less value than those of higher visibility for the detection of abnormalities on inspection of the results in a meridional quadrant taken by itself. Furthermore, they are of no value in cases in which only the nerve fibers that reach the far periphery of the field are affected. Their superiority, so far as diagnosis by means of the limits is concerned, is in the comparison of results obtained in the different meridional quadrants of the eye under observation, in a comparison of the results of that eye with those from the other eye, and in cases in which there is a partial loss of sensitivity over a comparatively large area. In all of these cases, stimuli of low visibility show a contraction when stimuli of high visibility may show nothing.

(8) In tables 4 to 6 are given the values obtained for the narrowest limit of the group, for the 5-percentile limit, and the limit that has been selected by the authors as designating cases that should be regarded as suspicious and kept under observation. For the convenience of the examiner these values have been singled out as aids in diagnosing. For the further convenience of the examiner the numerical values of the limits in each of the eight meridional quadrants which are regarded by the authors as suggestive of pathologic disturbance are also printed in their appropriate locations on the field maps given in figures 4 to 6.

(9) The frequency of distribution more nearly fits the normal or Gaussian curve for stimuli of high than of low visibility, color and form. This might be expected from the greater scatter of

results obtained with stimuli of low visibility. With stimuli of both high and low visibility the greatest symmetry of distribution about the median occurs in the horizontal meridian, temporal and nasal.

AN IMPROVED AND A NEW TEST FOR STEREOSCOPIC VISION*

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To a test described in 1903, which required no depth perception as a basis, the writer has added another, based upon the perception of luster and upon the principle that when two disparate retinal images are made unequal in intensity, the position of the image resulting from their "fusion" is shifted toward the more intense image. From the Howe Laboratory of Ophthalmology, Harvard University. Read before the New England Ophthalmological Society, January 17, 1933.

At first glance it would seem that tests for stereoscopic vision should be based upon the perception of depth. The Hering test with falling balls, and the use of stereoscopic diagrams giving the effect of a cone pointing towards or away from the observer are typical examples of such tests. As a matter of fact, they are never perfectly conclusive, because they depend upon the observer's stating whether an object is in front of or behind another object, and it is not impossible for a one-eyed man to guess this correctly, or even in some cases to determine it definitely by monocular perspective or other extraneous factors.

In 1903 I devised what I believe to be the most conclusive test for stereoscopic vision that has been brought forward up to the present time. The paper describing it was published in the "Ophthalmic Record," May, 1903, p. 205, and reprinted at the request of the editor in the "American Journal of Physiological Optics," 1926, v. 7, no. 3, p. 383, with a few additional remarks. Paradoxical as it may seem, in this test it was without importance whether or not the observer perceived depth effect. The test was based essentially on two facts: first, that two disparate retinal images are "fused" in the brain into a single intermediate image, only in those with the faculty of stereoscopic vision; and second, that one retinal image in one eye can in the brain apparently "fuse" with and alter the positions of two images from the other eye, each of which is slightly disparate with regard to it. I also described a modification of this test based upon still a different principle; namely, that the retinal image of a colored line can fuse with and impart its color to the image of a disparate gray line from the other retina. This modification, of course, is useless in cases of color blindness.

Recently by utilizing two new principles I have improved my original test and devised another, almost if not quite as conclusive, which likewise does not require the observation of depth. One of these principles, based upon the perception of luster, is new only in its application; the other is based upon a phenomenon which has not hitherto been described. The latter may be exemplified briefly as follows: If two nearly vertical black lines on a white background, at a slight angle to each other, are fused by means of a stereoscope, they will orginarily appear as a single intermediate line which has a fore-and-aft inclination. Let us assume that the upper end of the line before the right eye is tilted towards the right, and that of the other line towards the left. If now a smoked glass is placed before the right eye, the "fused" line will swing slightly towards the left, producing also a diminution in the stereoscopic effect.† If the smoked glass is placed so as to obscure

* The test cards described in this article may be obtained from the Ophthalmic Publishing Co., 508 Metropolitan Building, St. Louis, Mo., for twenty-five cents each.

† I have not yet determined whether or not the diminution in stereoscopic effect exactly corresponds to the displacement of the "fused" image.

only half of the line, the "fused" line will appear bent in the middle. If instead of using a smoked glass, a graduated shadow is thrown on one line, the "fused" line will appear slightly curved. The displacement may also be observed in the case of lines nearly horizontal, placed at an angle to each other where

Fig. 1 (Verhoeff). First test for stereoscopic vision. The test is positive only when two parallel lines, each bent with its ends towards the right, are seen through the stereoscope, and the circle is lustrous. When a single line is seen, only the right eye is being used. When two parallel lines are seen each of which appears straight or bent with its ends towards the left, the left eye alone is being used.

there is no stereoscopic effect. The phenomenon shows that when two disparate retinal images are made unequal in intensity, the position of the image resulting from their "fusion" is shifted towards the more intense image. It should not be confused with Pulfrich's phenomenon of the swinging pendulum. This is dependent upon the delayed perception of weak retinal stimuli, whereas in the present phenomenon, a similar time factor is not involved.

The improvement in my original test is shown in figure 1, which is to be viewed in a stereoscope. Each of the parallel lines in the original test was a continuous straight line, but here they have been bent very slightly at the center of the circle in an opposite way to the single line in the other circle. This is to obviate any possibility of the observer's imagining that the lines are bent to the right when the left eye alone is being used. The area within the circle is darkened to increase the effect of the single line in the other circle, and also to produce luster. The result of the test is positive only when two parallel lines are seen, both of which are bent in the middle so that their ends are towards the right. To prevent any misunderstanding, it is best for the observer to make a rough sketch showing the parallel lines and the direction in which they are bent.

The new test is shown in figure 2. Exactly equal illumination of the two diagrams is preferable but not essential. The result is positive only if the upper rod is seen to the right of the lower, the background has a darker shade within than outside the circle, and each rod has a white dot in it. Intelligent observers will note that the area within the circle has a metallic luster, but it is not necessary to recognize this. The upper rod will in this case appear behind, and the lower rod in front of the circle, but it is also not necessary to observe this. The same picture is seen when the card bearing the diagram is turned upside down, except that the depth effect is then reversed. The test is negative and only the right eye is being used if the rods contain no white dots. Only the left eye is being used if

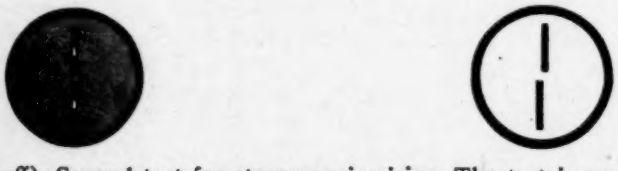

Fig. 2 (Verhoeff). Second test for stereoscopic vision. The test is positive only if the upper rod as seen through the stereoscope appears to the right of the lower, each rod shows a white dot, and the area within the circle appears dark or lustrous. If the rods show no dots, only the right eye is being used. If the upper rod appears directly above or to the left of the lower, only the left eye is being used.

the upper rod appears directly above or to the left of the lower. There is no guessing possible, as all the observations to be made are unmistakable. The two circles are so centered that when fused the disparateness of the retinal images of the two pairs of rods is equal but opposite. This prevents the upper or lower rods from being seen double as otherwise might be the case. The dark background in the circle on the left serves two purposes: first, it produces the same effect as the smoked glass referred to, and thus, in the case of stereoscopic vision, makes the upper rod appear definitely to the right of the lower; and second, by making the background appear dark and lustrous within the circle it certifies that the diagram on the left is not being suppressed. This is further certified by the white dots, which show that the rods in the latter diagram are being "fused" with the rods in the other diagram. In this diagram the upper rod is placed slightly to the left of the lower, for if it were directly above, the observer might imagine it was slightly to the right if he used the left eye alone. When there is stereoscopic vision, the dots will at first appear to lie within the rods, but careful observation will show the lower dot behind its rod. The dots really appear in the horopter, and their positions, therefore, vary as the point of fixation varies.

These tests are, of course, not applicable when the observer has insufficient visual acuity in one or both eyes to distinguish the rods and dots plainly. Certain individuals with low visual acuity may have perception of relief dependent upon widely disparate images, but I know of no test that will demonstrate this with more than a high degree of probability.

243 Charles street.

HYSTERIC AMBLYOPIA

Report of three cases

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AND
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The three cases described illustrate the type of subject in whom this condition may appear. In two of them it was unilateral. Perfect vision was restored by suggestion, in two cases after lumbar puncture and in the third after ether narcosis for an unrelated operation. Read before the Pacific Coast Oto-Ophthalmological Society in Seattle, Washington, June 30, 1932. From the Department of Ophthalmology, University of California Medical School.

Hysteric amblyopia has been recognized for many years. It was well described during the last century by such men as Von Graefe, Charcot, and Leber. During the World War and since that time, numerous cases have been reported.

While hysteria usually is classed as a neurologic clinical entity, it is, properly speaking, a mental disorder, a psychopathologic condition. In the eye, hysteria may show itself in various conditions, such as blepharospasm, conjunctivitis, ptosis, spasm of accommodation, paralysis of extraocular muscles, field changes, and amaurosis. The degree of amblyopia varies from a relatively small amount, to complete blindness. In this report we are concerned primarily with field changes and amaurosis.

In hysterical blindness, most authorities are agreed that the lack of vision is not caused by a failure of the retina to perceive images, but by a functional disturbance of the cortical centers. Both sexes may be affected at varying ages. One of Lewis's[1] patients was only ten years old and another was but fifteen. Although the condition may be unilateral, Duane[2] believes it to be present usually in both eyes. However, it is likely to be of greater degree on the side upon which the general sensibility is affected.

These patients usually possess rather unstable nervous systems, hence, a psychic shock, particularly in the presence of an existing unhappy state, is likely to produce hysteric amblyopia. Burch[3] especially emphasized the importance of this so-called intolerable situation. It usually is based on prejudice, fear, unhappy environment, or unfortunate domestic or marital circumstances.

There are two general types of hysteric amblyopia. In the first, there is a history of trauma accompanied by nervous strain or shock in a susceptible person. As a rule, disturbing mental factors are also present. During the World War, a large number of these patients was observed. Eder[4], reported the case of a soldier who was firing through a loophole, the periphery of which was struck repeatedly by bullets. He experienced some watering of the eyes, which promptly precipitated an hysteric amblyopia. Lagrange's[5] patient was rendered unconscious by a bomb. Although unharmed by the explosion, he developed a complete amaurosis.

In recent years, because of the growth of industrial medicine, there has been added a pecuniary motive intensifying those suggestive influences already present. This is well illustrated in Burch's[3] first case. Great care must be exercised to avoid confusing these hysteric patients with malingerers.

The second type of hysteric amblyopia has been called idiopathetic. In this group, we find no trauma, although a nervous shock, predisposition and an unhappy state are frequently present. At times, blindness suggests a way out of an unpleasant situation. Ames[6] reported two cases, in each of which some feature of the patient's mental life made vision undesirable or suggested blindness as a possible refuge from trouble.

Lewis[1] emphasized the importance of suggestion. One of his patients had

a high degree of hyperopia and one amblyopic eye. Some careless remarks to the child, relative to approaching blindness precipitated hysteric amblyopia. In Campbell's[7] case, amblyopia could be traced to the impression made upon the patient by her father's blindness.

Distressing family life and poor economic conditions may be important factors as illustrated by the cases of Lewis and Burch. In some instances, the additional personal attention received while ill or indisposed, served as a causative factor.

Symptoms and signs in the diagnosis of hysteric amblyopia are well recognized. The most important symptom is loss of vision, unilateral or bilateral, varying as before stated, from a relatively small degree to complete amaurosis.

Closely associated with the loss of vision, are the varying changes in the perimetric fields. The most characteristic field shows a tubular contraction for form to within 10 to 15 degrees of fixation, which does not vary with the change of distance between the patient's eye and the point of fixation. Spiral fields and interlacing color fields also are recognized as typical.

At times, central or paracentral scotomata are present. In these instances, retrobulbar neuritis, multiple sclerosis, and other organic conditions producing central or paracentral scotomata, must be carefully excluded. The hemianopic field is said never to be present in hysteria, yet Garvey[8] reported a case in which homonymous hemianopsia was present. The fact that psychotherapy restored the field to normal seems to prove that the condition was hysteria. Hurst and Symns[9] doubt the value of taking the perimetric fields and feel that the use of the perimeter invariably results in suggesting a narrowed field to the patient. They also stated that they "have never seen patients with hysteric symptoms who spontaneously complained of disabilities resulting from a narrow field of vision."

Objective examination of patients with hysteric amblyopia shows a complete lack of pathologic change in the fundus sufficient to explain the visual loss. In addition, direct and consensual pupillary reactions are ordinarily normal. The reactions may be sluggish in some instances or even absent, as in an unusual case reported by Harlan[10] Normal pupillary reactions, while important in the diagnosis of hysteric amblyopia, do not exclude malingering.

Hysteric amblyopia may be complicated by muscle involvement. Lillie[11] reported a case which showed hysteric convergent strabismus. Alger's[12] patient had a similar condition, for which surgery had been suggested. A complete paralysis of extraocular muscles was simulated in our first case.

Therapy in these amblyopic cases naturally varies and must be applied with a good deal of judgment. The patient should never be told that his eyes are normal. In discussing the condition with him, one must admit freely that there is a loss of vision but may explain that the cause has been found and the condition can, and will, be remedied.

Psychotherapy in its various forms is our most important remedy. Many patients have been improved by the use of electricity. Strychnine hypodermics are used widely. Their beneficial effect is probably mental. Moore[13] reported two cases cured by narcosis. Deep ether anesthesia was used, the patients being assured that the seat of the trouble had been discovered and removed. Hypnosis also is used successfully. Lagrange[5] restored the vision in his patient by a pretended operation upon the eye.

Punishment, according to Hertz and Ormond[14], whether suggested or real, is of no value and may do actual harm.

Suggestion is our most important ally in the cure of these cases. The confidence of the patient must be gained to insure success, irrespective of the physical means used. In addition, determination and correction of the intolerable situation is most desirable. In Lagrange's case, the patient was assured that he no longer would be fit for military duty. In one of Burch's patients, the trouble cleared spontaneously when the marital difficulties had been adjusted. There can be little doubt that the majority of miraculous restorations

of vision claimed by Christian Science, faith healers, spiritualism, visits to shrines, or the laying on of hands by pseudo-religious workers occurs in patients suffering from hysteric amblyopia. The cures are based on suggestion and profound faith.

The following widely different cases are reported because each presents some interesting phase:

Case 1. S. E., female, divorced, aged 24, years, entered the University Hospital on Nov. 10, 1929, for a perineal repair. There had been complete bilateral loss of vision for one month prior to entry.

Résumé of history bearing upon ocular conditions: The patient always had been nervous and high strung. She was married at the age of 21 because of her desire for a child. One year later, her pregnancy was terminated at 8 months, the child living only 6 hours. Delivery, by means of high forceps, resulted in a marked third-degree tear. To make matters worse at this time, she was deserted by her husband. The patient was a graduate nurse and after the termination of her pregnancy, worked as night supervisor in a hospital for one year. Because of rectal incontinence, she frequently went several days without eating and, no doubt as a result of this lack of food, she fainted a number of times while on duty.

She had never experienced any difficulty with her eyes until one month before entry, when her vision started to fail and she rapidly became blind. At the time of examination, the patient said that she could see nothing, but could distinguish between light and darkness. She had been examined by a number of ophthalmologists and after each examination she had been told that the condition was purely functional.

Examination showed a well-developed young woman sitting in bed, with fixed eyes looking straight ahead. The general physical examination was negative, except for her gynecologic condition. Ophthalmologically, she could not distinguish the movement of hands before her eyes, nor did she flinch or wink until the eye lashes were touched. The eyes were fixed and did not move in any direction, resembling an ophthalmoplegia externa. The pupils were equal, round, and regular; they reacted well to light, both directly and consensually. Aside from the foregoing condition, the external examination was negative. The media were clear. The fundi were normal, the optic discs being clean cut and without evidence of atrophy.

During the fundus examination, when instructed to turn her eyes to one side, she turned her head in that direction but rotated her eyes to the opposite direction.

It was obviously impossible to take perimetric fields.

The ocular condition was diagnosed as hysteric amaurosis.

Treatment: Various types of local treatment to the eyes were used for several days without success. At this time, it became necessary to drain a pelvic abscess.

Anticipating the opportunity for psychotherapy, an ether anesthetic was agreed upon. The patient was told that it was most fortunate that narcosis was required at this time, because by it, her vision would be restored completely. As she was a nurse, the underlying mechanism was explained to her as follows: In such functional disorders as hers, visual impulses are short circuited before they reach the visual centers. Under the anesthetic, however, all impulses cease and when consciousness is regained, they again flow along the nerve pathways and pass the spot where previously they had been deflected. Thus, upon awakening, she would see perfectly again. Upon recovery from her anesthetic, the vision had returned entirely and the ocular movements were again normal.

Case 2. A. K., aged 36 years, was seen on July 21, 1931, in the Medical Service of the University of California Medical School Hospital and the résumé is from their records.

The patient entered the hospital on July 20, 1931, complaining of headaches, and loss of vision in the left eye.

History: (Only that portion dealing with the amaurosis is given here.) At the age of 19 years, the patient had a temporary loss of vision in both eyes, lasting thirty minutes, which occurred

after a heavy meal. He had no further trouble with his eyes until February, 1929. At this time, he began work as a newspaper photo-engraver. Here he was "worked too hard," was "rushed," and "treated very unfairly" by his foreman, who was a "drunkard." His work necessitated his repeatedly going in and out of a dark room, which produced such severe pains in his eyes that it was necessary to procure glasses. Simultaneously, headaches developed which he "silently suffered" for a time; but their severity soon made it necessary for him to discontinue his work. Three months later he gradually lost the vision of both eyes for a period of four days. During this time, he worried a great deal because of the fact that his wife was pregnant. In the next few months he had several attacks of temporary loss of vision.

In October, 1929, because of disability insurance claims, he was subjected to an exhaustive physical examination lasting four days. During this examination, drops were put into his eyes to dilate the pupils. Within one hour he was entirely blind. After an interval of four days, the vision of the right eye had returned to normal but the vision of the left eye remained limited to perception of light. Since that time, he had had several short attacks of blindness in the right eye following nervous shocks (the birth of a son, a bad cold, a second insurance examination, and so forth).

During his disability, he had received $115 a month compensation from his lodge and the insurance company, together with a good deal of sympathy at home.

General physical examination was negative.

Ophthalmological examination: Vision, right eye, 1.0; left eye, limited to light perception. The pupils were equal, round, and regular, reacting promptly to light both directly and consensually. The external ocular muscles were normal, the media, clear, and the fundi normal. The perimetric field of the right eye was normal; it was impossible to obtain the field of the left eye.

Treatment: The Medical Service wished to examine the spinal fluid and this was used as a psychotherapeutic measure. The patient was told that his eyes were normal but that the visual impulses of the left eye did not reach the brain, because of pressure in a cistern at the base of the brain. As soon as this pressure could be relieved by spinal puncture, the vision would be restored.

A lumbar puncture was attempted, but was unsuccessful, no fluid being obtained. The patient, however, was told that the fluid was withdrawn freely. During this time, the right (normal) eye was covered, but even so, the patient said that the light was enough brighter to cause him photophobia by the time the procedure was ended! Both eyes were then bandaged for 72 hours, the patient being assured that upon removal of the dressings the left eye would be well. Such was the case, the patient being able to recognize a relative, read print and tell time with the previously blind eye. Since then, the vision has remained normal in both eyes but he now complains of severe leg pains.

Case 3. Miss M. H., aged 36 years, entered San Francisco Hospital on September 12, 1931, complaining of burning pain in the epigastrium and blindness of the right eye. Originally a coffee packer, she had been unemployed for the past nine years on account of ill health. Her past history for the most part concerns hospitalization.

In 1912, she had had an appendectomy on account of gastric complaints. Since then, she has had six other abdominal operations for intestinal adhesions. Her entry note contained the comment that she had exhausted the patience of the Social Service Department and most of the relief organizations of San Francisco in trying to gain readmission to the San Francisco Hospital.

Regarding her eyes, the patient had been told as a child that she would require drops and glasses in order to improve the vision in her right eye. Drops were used but no glasses were obtained until five years later when, she stated, this eye was blind, the nerve having been killed, in her opinion, by the medicine. At entry, she was unable to read for more than five minutes at a time

and could not distinguish light from darkness with the right eye.

Examination showed a thin, undernourished, introspective woman with a "resigned-to-suffering" expression. She frequently mentioned her seven operations, and with equal good humor stated that she could hardly bear her pain. She was quite willing to undergo anything suggested for its relief.

General physical findings will be omitted in this report. The eye examination showed normal vision in the left eye, with normal fundus; both eyes were normal externally. She denied vision in the right eye and made no attempt at closure when the moving hand was brought into close proximity. The pupil, however, reacted to light both directly and consensually and to accommodation, particularly when she thought she was looking out of the good eye. The fundus was normal and the intraocular tension not increased. A diagnosis of hysteric amblyopia was obvious.

The patient was told that pressure on the sight nerve caused her blindness and that by removing this pressure, her vision would be restored; it was necessary only to puncture the spine and draw off some fluid. Consequently, a lumbar puncture was done. To protect her eyes from the sudden return of light, a binocular dressing first was applied! This was removed the following day and, as promised, she could see out of the right eye.

Comments. The first case is typical of hysteric amaurosis. The patient's mental attitude is indicated by the fact that she married only for the sake of having a child. This desire was thwarted by a complicated and disastrous pregnancy which left the patient in no physical or mental state to bear the shock of desertion or to earn her own livelihood. The treatment necessitated a more plausible explanation of her disability and a more logical means of cure than would have been necessary in one unfamiliar with medical practice. Fortunately, ether narcosis together with reassurance produced the desired effect.

In the second case, unilateral amaurosis developed in a susceptible individual. The difficulty with the eyes was an easy way out of unhappy working conditions and increased family responsibilities. Undue sympathy at home and regular compensation undoubtedly favored both the onset and the continuation of his disability. Each medical examination acted adversely, since the probable fear of being found normal brought forth compensating autosuggestions of helplessness. It is interesting to note that although no spinal fluid was obtained, the attempted puncture had the desired effect. It is not unlikely that this individual will manifest additional hysterical phenomena.

Case 3 represents a curious mixture of mental instability on the one hand combined with devotion to an idea which approaches heroism. Seven major abdominal operations and in addition, two hospital seances for medical treatment are enough to tax the courage of the bravest, yet this patient is still willing to undergo further surgery if necessary to relieve the burning in her stomach! The desire for attention and dearth of interest in her home environment plus a certain pride in her past misfortunes are probable factors. She is naturally a candidate for further hysteric manifestations since none of the underlying psychic factors have been eliminated.

From the therapy used in cases 1, 2, and 3, it is apparent that no definite treatment can be outlined. One must be alert to utilize any procedure that may present itself. In general, a prearranged explanation of the patient's condition should be followed by a plausible cure, together with reassurance.

384 Post street.

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INTRACAPSULAR EXTRACTION OF THE CRYSTALLINE LENS CONTAINING A FOREIGN BODY

Report of three cases

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Intracapsular extraction of the lens containing a foreign body is recommended as the best method of removal of such foreign bodies and the conservation of vision. Three successful cases are reported. Read before the Section on Ophthalmology, College of Physicians, Philadelphia, December 15, 1932.

All cases of foreign body in the crystalline lens are of interest because none occurs without giving rise to a serious surgical problem, the solving of which depends, of course, upon the character and position of the wound of entrance, the size and substance of the intruded body, together with the degree of destruction present in the lens. When the problem has been solved successfully one is justified in self-gratulation over the achievement. It is a rare occurrence if the lens is not entirely disorganized, remotely or within a few days after the injury; and, if the foreign body be of soft metal and allowed to remain, not seldom does a gradual dissolution of the metal ensue accompanied by a dispersion of the metallic particles into the lens capsule, together with their permeation by absorption into the ciliary body and throughout the uvea until the sight of the eye is destroyed.

We repeatedly have seen cases in which the keen edges of tiny spicules have cleanly penetrated the cornea, and passing through the iris or directly through the pupillary space, have become lodged in the lens, leaving a scar visible only through the corneal microscope; and in which the foreign substance has caused but little if any destruction of the lenticular layers. There have been others in which the blunt surfaces of the penetrating body have carried destruction into all the tissues within their pathway; while in still another class there has been only a general disintegration of the lens substance with the creation of a more or less rapidly developed cataract, attended by distension of the capsule. In these cases the capsular wound becomes tightly closed giving rise to a rapid swelling of the lenticular body so great as to be followed by pressure on the ciliary structures and violent symptoms of glaucoma. Therefore, no case of foreign body in the lens is free from danger, and, although there might not at any time occur much reaction over a period of years, ultimately, total destruction of the visual elements occurs through an insidious degeneration, especially when the encapsulated substance is a metal dissoluble in the ocular fluids.

In no class of cases is the property of self-restraint on the part of the surgeon so imperative as that in which he can see a foreign body embedded in the lens perhaps by the unaided eye or even by the use of instruments, because if he attempts immediately to extract the offending mass such efforts might cause greater damage than did the wounding of the globe at the time when

the original injury was received. When not to do anything is a nice point to determine.

In the class of injuries in which a cataract has been fully formed and retained within the capsule one may attempt the extraction of the entire lens without disturbing or otherwise dislodging the piece of metal or other foreign substance. It is with this group that this report is concerned.

The first case, was that of a man, who on September 29, 1925, while pounding a hoop with hatchet and hammer, felt a sharp pain in his right eye, which was followed by nothing more serious than an annoying glare of light. Ten days later, Dr. Brasefield of Phillipsburg, New Jersey, who referred the man to me, saw in the lens a glittering body, and I discovered a tiny linear scar on the outer side of the summit of the cornea, and, through the active but expanded pupil, in the anterior cortex of the lens a triangular opacity shaped like a multipolar cell. When mydriasis was effected an irregular, spiculate, dark mass was seen in the lens toward the nasal side of the triangular opacity. With these exceptions the lens was quite clear, and, as there was no disturbance of the vitreous, the background of the eye could be perfectly seen. Visual acuity was 6/5. The eye was so quiet, and the patient so incredulous that he had been seriously injured, that he was unwilling to have any "interference" with his *status quo* and I could do nothing but direct that the patient must report frequently for examinations. In the following twelve months he was observed repeatedly. The lens became only a little changed, but, by June, 1927, a complete cataract was present, the capsule of the lens showed numerous brownish spots in its substance, and the foreign body was no longer visible. The patient at this date was quite willing to have the cataract removed. Accordingly, on June 15 I made an upward incision with a Graefe knife. The capsule was seized with a toothed forceps, and to the limbus was adjusted first a spatula, and then the concavity of a small tenotomy hook. The large swollen lens was next detached from the zonule and slowly and deliberately extracted from the chamber without the breaking of the capsule nor the laceration of the hyaloid. On the night of the fifth day following the extraction, while adjusting his pillow, the patient had a sharp pain in his eye and on the next day free blood was seen in the aqueous, evidently derived from the imperfectly healed wound of incision. On the seventh day the man pleaded that he might be allowed to return to his home. When examined at my office there were a few shreds of blood streaking the aqueous, otherwise the healing was uneventful. It was possible to see the vitreous bulged forward into the aqueous chamber. All has gone quite well ever since—now seven years ago.

The second case was that of a man who stated that he was a journeyman farmer, but whose story was quite rambling. He believed that a small stone was driven into his right eye when he was struck in it many years previous to 1928. A doctor, he said, had examined his eye some time after 1914, and it had been arranged that some operation should be done; but the doctor was called away to the War, since when he had known nothing of his whereabouts. Recently, the sight of his left eye had failed because of cataract and he had become anxious to have the right eye operated upon.

No scars were visible in the anterior segment. The iris was tremulous; the lens was in a state of hypermature cataract, and a dense mass about 1 mm. in diameter was seen lodged in it. There was good perception in all fields.

On June 1, 1928, with a Weiss-Graefe knife a rather large incision was made, and afterwards, a narrow upward coloboma in the iris, which on expansion allowed the lens to bulge forward. This was seized with Leur forceps. Upon applying pressure with a tenotomy hook the lens was dislocated, and by gentle traction drawn out from the chamber. No accident followed and the aftercourse was entirely satisfactory. On July 1, the corrected vision equalled 4/4. When last seen, in March, 1929, the surgical result was all that one could have desired, and the opacity of the left lens

seemed to have become less dense than it was when first seen.

The third case was that of an Italian, twenty-three years of age, who consulted me in March, 1930, stating that six months previously, while releasing a bolt with chisel and hammer, something struck his right eye. He was quite uncertain about events; it was not, however, during the course of his regular employment. All he was sure of was that on that day his sight had become suddenly darkened. He had been treated variously, x-ray having failed to show the presence of a foreign body. His eye did not become inflamed until about two weeks before he was brought to me. The swollen fibers were rapidly undergoing changes throughout; the capsule was discolored. With the slitlamp a dense reflecting body was seen in the lens, and, on deeper penetration of the light, there was an interesting appearance of wrinkling and staining of the hyaloid. I afterwards had an opportunity to examine the plates, which had been made by an expert in radiography, yet there were no shadows on them indicative of a foreign body in the orbital region. Besides noting a cicatrix in the cornea, the lens looked like photographs of the full moon's surface. On March 31, extraction without iridectomy was performed, a large conjunctival flap being secured. The pupil becoming widely expanded, by outer pressure exerted at the lower chord of the cornea, the lens was easily dislocated and then withdrawn with Kalt capsule forceps. A wide, round pupil was obtained. The man had been married only a few weeks and would not stay in the hospital after the fifth day. On April 17, with correction, his visual acuity was 4/4; on October 4, 1930, 4/3. Numerous opportunities for review have been afforded since; all has gone well. The patient prefers to go without spectacles.

In times past I have seen such cases as these treated differently; certain of my distinguished teachers would incise the lens, abstract the broken-down substance by one means or another, hoping the foreign body might become engaged in the debris and be evacuated along with it; in other instances they performed a peripheral extraction of the traumatised cataract. Not infrequently the hyaloid was incised in the process and, commonly, marked reaction followed. My attitude toward the here detailed cases has been simply to disregard the fact that a foreign body was present to complicate an extraction.

Since the adoption of procedures by which the crystalline lens within its capsule can be removed entire by a single operation, we have become more venturesome in operations involving the lens than in the days when most operators were filled with fear lest the zonule be ruptured, the hyaloid lacerated, and the vitreous discharged.

I am grateful to Col. Smith for the influence he exerted upon me. I am certain he influenced others likewise, when, on his visit to Wills Hospital several years ago, as he operated upon a number of patients both from my own service and those of my colleagues, he dispelled my fear and dread of accidents and difficulties which had hitherto hovered over me during extractions by older methods. Perhaps it was rather the boldness with which he pursued his radical procedure that has given us courage to act with greater force and directness in the accomplishment of our own particular technic. At least, I will say with confidence, my records show that escape of vitreous has been of rarer occurrence since the time I observed him operate, although I have not once attempted to follow his technic. I have, however, removed, and constantly have attempted to remove, the lens entirely within its unruptured capsule; and thus it is that I am able to report the extraction of three lenses in each of which was a foreign body. The specimens are here; they have remained whole, but have become much discolored so that it is difficult to see in them the foreign particles.

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THE CROSS CYLINDER

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The practical use and importance of the cross cylinder are explained. It is an instrument for accurate measurement of refraction. What it does is best understood by simple experiments.

The cross-cylinder lens has the effect of a convex cylinder and a concave cylinder, of equal strengths, combined with their axes at right angles to each other, making a cylinder cross. This gives a cylinder effect equal to the added strength of both cylinders. The lens is commonly made by grinding a cylindric surface of a certain strength on one, and a spherical of half that strength, on the other surface. Thus a —1. cylinder with a +0.50 spherical gives the effect of a +0.50 cylinder —0.50 cylinder. The direction of the minus cylinder axis must be accurately marked on the lens, and, exactly at right angles thereto, the direction of the plus axis.

Fig. 1 (Jackson). Cross cylinder properly mounted.

This lens must be mounted in a ring, with a round handle, convenient to roll between the thumb and finger, and with the directions of the two axes exactly 45 degrees from the direction of the handle. These axes should be clearly marked on the lens and designated by + and — signs, so that it is easy to see what is being done at any instant. The ring mounting and lens should be at least one-and-one-half inches in diameter; even when the lenses used in the trial frame are only one-and-one-quarter, or one inch in diameter.

The cross cylinder is used as a supplementary lens, held in front of the trial frames in which are placed the lenses supposed to approximate the correction. It is used to test the accuracy of the cylinder already chosen; whether it can be improved, and what change will make the improvement. If accuracy in the cylindric correction is not desired, or is a matter of indifference, the cross cylinder is not a necessity. But even then it is a convenience, and may save time in finding a cylinder that "will do." Two things have to be known, to prescribe a cylindrical correcting lens—the right strength and the right direction for its axis. These are determined independently, with a cross cylinder. Either can be known approximately, before the other has been accurately determined. Both may be fixed with accuracy, before the spherical correction has been settled; and before the best vision has been secured.

To use a cross cylinder the trial frames are to be placed on the patient, with an approximate correction before the eye to be tested, and a ground glass, or blur glass before the other. The cross cylinder is then held an inch or two before the lenses in the trial frame, one of its axes parallel to that of the trial cylinder in the trial frame. With the round handle rolled between the thumb and forefinger of the examiner, the axes of the cross cylinder are quickly reversed, so that at one time they add to the power of the cylinder before the eye, and at the next instant diminish it. The patient is told to look at the lowest line he can read, or partly read, on the chart, and asked which turn of the cross cylinder makes the letters more distinct, or more blurred. When the trial cylinder (in the trial frame) is very nearly an accurate correction, the cross cylinder makes vision worse either way; and the patient is asked which of the two ways makes it the worse.

To fix the meridians for cylinder axes, the cylinder in the trial frame should be made a little too strong for the most perfect correction; as, for example, a 1.25 D., when a 1. D. seems needed. With this in the trial frame, hold the

cross cylinder before it, with the handle parallel, or perpendicular, to the direction of the cylinder axis in the trial frame. This will bring the axes of the cross cylinder at 45 degrees from the axis of the trial cylinder. Again rotate the handle between thumb and finger, reversing the position of the axes, and ask the patient which makes the line of letters more distinct, or less distinct. Notice the direction of the axes when the letters are most distinct; and turn the axis of the cylinder in the trial frame a little toward the direction of the similar axis of the cross cylinder; plus toward plus, minus toward minus. Test the new direction of trial lens again, in the same way. Continue such changes until the axis of the trial lens cannot be turned either way, even two or three degrees, without the patient's expressing a preference to have it turned back again.

When the exact meridian for the correcting cylinder has been found, its strength should be corrected. Then tests are made for the exact spherical correction required; by placing what may seem to be a little too strong plus spherical lens, and testing if the patient can really recognize more letters, when a —0.25 sph. is held in front of it. Even when all this has been done, with apparently satisfactory results, it is best to go over the tests on another day, taking care to have the eyes rested before testing, and starting with the cylinders found the day before, and a little (0.50 D.) convexity added to the spherical. It is common to find that the lenses chosen at the end of the previous testing, are not quite the best. It is safer to repeat such testings, until tests on successive days, made under favorable conditions, give the same results.

In this way, great certainty and exactness are attained in the measurement of regular astigmatism, even without the use of a cycloplegic or much assistance from other methods of testing. With an intelligent patient, who has done much reading, and wishes to improve his vision, the cross cylinder can be used with good results, when no other method of detecting and measuring astigmatism is practical. In elderly people the ophthalmometer gives little, or no help. With hazy media the shadow test is quite useless. With very irregular refraction, of either lens or cornea, this subjective testing may still reveal regular astigmatism of practical importance to correct. In such cases the cross cylinder is indispensable.

The strength of cross cylinder that is most generally useful is the +0.50 —0.50; the one made by combining —1.D. cylinder with +0.50 D. spherical. This is useful in practically all cases. For eyes that are capable of standard vision, or better than that, a weaker cross cylinder +0.25 —0.25 (made of a —.50 cyl. ⌯ +0.25 sph.), may be used, after the strength and meridians of the cylinder have been approximated. For eyes that have poor vision, but may have important astigmatism that cannot be measured in any other way, it is worth while to have a stronger cross cylinder, the +1. —1., made with —2. cyl. ⌯ +1. sph. In cases of high myopia, partial cataract, or irregular cornea, the cross cylinder may show, and measure, the astigmatism that it will be an important help to have corrected.

The above three strengths are all that are necessary. Intermediate strengths are of little, or no help. A weaker one, +0.12 —0.12, made by —0.25 cyl. with a +0.12 sph., makes so little change that nearly all people with good vision do not notice it; and their answers to it mislead rather than help. For the very few cases in which a very strong cross cylinder might be used, one can be improvised by taking cylinders from the trial case. A +3.D. and a —3.D. held with their axes exactly at right angles may be tried before the eye, in various directions. This will sometimes give valuable information, as in cases of partial cataract, where little red reflex can be obtained in the pupil, or of scarred cornea.

In general when the vision is poor the stronger cross cylinder should be used first. In all subjective testing it is important that the impression made should be so positive that the patient cannot ignore it, or mistake it. If a test leaves the patient uncertain, the examiner will be still more uncertain, or

led to make a change in the wrong direction. If the change is too great, both ways being worse, the patient is less likely to choose rightly, than if a smaller change leaves a difference between the two that is recognizable. Start with the cross cylinder that may be too strong, and use the weaker ones as the vision improves.

For one who is beginning to use cross cylinders excellent photographic illustrations of such cylinders, their mounting, effects and manner of using them, have been given by Dr. William H. Crisp (Trans. Ophth. Soc. United Kingdom, v. 51, p. 495), in his paper read before the Oxford Congress in 1931 (Amer. Jour. Ophth., v. 15, no. 8, p. 928). Without other helps the best way to get acquainted with the cross cylinder is to test one's own eyes with it. If your eye has astigmatism test that. If you are wearing what you think is the correcting glass for it, test its accuracy. If you have no astigmatism, put a +0.50 cylinder in a trial frame before your eyes, and test the direction of its axis. Add a —0.50 cylinder in front of the +0.50, and test for off axis. Try how small a change in the axis can be recognized with the cross cylinder. This kind of self-testing will often help those who have used the cross cylinder, and may think they understand its principle.

The optical principles on which such tests are based can be understood from a few simple experiments. Two cylindrical lenses placed together in a trial frame, receiving light from a point source, and focussing it on a screen, furnish the needful apparatus. A convex spherical lens of convenient focal length will complete the optical imitation of the eye. The turning of one of the cylinders shows the effect produced by turning the cross cylinder. The same arrangement can illustrate what happens in skiascopy, when the cylinder has to be turned to correct the astigmatism exactly.

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EXTRACTION OF CONGENITAL AND YOUNG ADULT TRAUMATIC CATARACT BY THE METHOD OF BARKAN

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This is a report of six cases in which this method was used successfully. Read before the St. Louis Ophthalmic Society, November 25, 1932.

For many years the needling operation (or simple opening of the lens capsule to allow absorption of lens substance) has been the one most generally used in cases of congenital and juvenile cataract and of cataract (whether traumatic or not) in early adult life. That this operation does not wholly satisfy is attested by the frequent references in the literature to the child or young adult subjected to several operations, each followed by an inflammatory reaction of greater or less severity.

Thirty-five years ago Hess called attention to the inadequacies and objectionable features of the discission operation. Even though recovery may seem complete, the eye may still be vulnerable. For example, Barkan observed two cases of retinal detachment in adult life which he attributes to repeated discissions in childhood. With a better understanding of allergic manifestations, it seems probable that some of the unfortunate remote effects of discission may be thus explained.

In general all operations for cataract fall into one of two classes: (1) those which expose the cortex to absorption by the ocular fluids, and (2) those which actually removed the lenticular substance from the eye—extraction or expression.

If complete absorption always followed the opening of the lens capsule, and if the inflammatory reaction which often follows were certain not to injure the eye permanently, needling, because of its simplicity, would be the operation of choice.

Operations which fall into the second class (extraction) have not supplanted discission for the reason that they, too, have objectionable features. In the extraction of a cataract through a corneal or linear incision the iris is the most troublesome structure. If an iridectomy is done the eye is disfigured and the development of the iris is interfered with. Most of the usual incisions favor prolapse, incarceration, and injury of this tissue.

Otto Barkan* describes an operation for the extraction of congenital, soft, and membranous cataracts, which has for its main purpose the preservation of the iris. There are two essential features in the Barkan procedure: (1) dilatation of the pupil *ad maximum* by the subconjunctival injection of adrenalin 1/1000, and (2) an oblique corneal incision, one or two millimeters from the limbus.

In addition to the usual ischaemia, control of hemorrhage and reduction of intraocular pressure, the adrenalin dilates the pupil by stimulating sympathetic nerve endings which control the dilator fibers. Unlike the dilatation induced by atropin, the pupil remains expanded even when the anterior chamber is opened. This tends to prevent prolapse of the iris even though the incision be made incorrectly.

Having obtained maximal dilatation (which in many cases causes the iris almost to disappear from view) the incision is made in the cornea about two millimeters from the limbus, the keratome being entered very obliquely. Thus is produced a valvelike opening which is quickly sealed as soon as the aqueous has reformed and some degree of intraocular pressure has been re-established. There is no tendency on the part of the wound to gape since the

* Otto Barkan. A procedure for the extraction of congenital, soft, and membranous cataracts. Amer. Jour. Ophth., 1932, February; pp. 117-124.

greater the intraocular pressure the more firmly is the posterior shelf of the incision pressed against the anterior one.

Through this opening in the cornea may be introduced cystitome, capsule forceps, hook, spoon, irrigator tip, or even scissors, as may be required by the type of cataract or membrane. The amount of manipulation possible is surprising, with no tendency to prolapse of the well-retracted iris. Owing to the associated hypotony there is very little danger of loss of vitreous.

Case Reports

Case 1. O. C., male, aged 22 years, was first seen March 15, 1932.

History: At the age of three the patient was kicked by a cow on the left side of the head. A year later, his parents observed "a white mass in the pupil." In 1931, he consulted an oculist who performed two operations—the second one several months after the first. Judging from the patient's description, these were probably simple discissions. Vision: O.D. = 6/6+, normal in all respects. O.S. = hand motion at 2/3 meter.

Examination: A very dense centrally located membrane enmeshed masses of cortex. There was a red reflex, but no details were obtainable through the periphery of a widely dilated pupil. Projection indicated a full field, but the visual integrity of the eye was questionable as vision was improvable only to fingers at 1/2 meter with a cataract lens.

Operation: On April 15, 1932, the pupil was freely dilated with 1 percent atropin, followed by 8 drops subconjunctivally of adrenalin chloride 1/1000 near the corneal margin at "12 o'clock." The pupil dilated *ad maximum*. The usual shelving incision with the keratome was made. The pupil showed no tendency to contract, so the membrane was grasped with capsule forceps and a good-sized piece removed. This released much loose cortex which was spooned and irrigated out. Vitreous presented but did not prolapse. At the end of the operation the pupil was clear, round, and still semidilated.

After an uneventful recovery it was found that the pupil was slightly displaced vertically due (as was proved by biomicroscopy) to a band extending from the upper pupillary margin to the scar of the operation wound. Our suspicions as to the inferior visual status of the eye were confirmed by failure to secure vision better than finger counting at 1/2 meter. The presence of a large central scotoma was demonstrated, although a diligent search of the eyeground failed to disclose any ophthalmoscopic reason therefor. There were no signs of retinal detachment.

Case 2. G. F., male, aged 27 years, was first seen August 2, 1932.

History: Two months ago he noticed dimness of vision O.D., which gradually increased. Vision now was only light perception. There was no history of injury.

Examination: Vision O.D. = light perception; O.S. = 6/5.

There was a dense grey cataractous mass in the pupillary space. The pupil was round and reacted to light. Projection was good. The cornea was clear, showing no evidence of a penetrating injury.

Operation: On August 4, 1932, under cocain anesthesia, adrenalin chloride 1/1000 was injected subconjunctivally, near the limbus at "9, 12, and 3 o'clock." The pupil dilated most widely adjacent to the sites of the injections. An oblique keratome incision was made through the cornea about 2 mm. from the upper limbus. The capsule was opened by a crucial cut with the cystitome. The pupil remained fully dilated. Considerable soft lens material was irrigated from the chamber, leaving a clear black pupil. Atropin was used, and a monocular bandage applied.

There were no postoperative complications; the pupil remained round and the anterior chamber of normal depth. The patient was discharged from the hospital on the third day. On September 12, with +12.25 D.sph., vision was 6/4 partly.

Case 3. T. W., aged 23 years (colored), was first seen May 8, 1932.

History: On March 31, 1932, while chopping wood, a small piece flew up and struck his left eye. After several days the eye "healed," but vision began to fail.

Examination: Vision, O.D. = 6/10; O.S.= light perception.

In the left eye was a corneal scar at "3:00 o'clock," between the limbus and center of the cornea. The pupil was slightly irregular with anterior synechiae at the point of the corneal scar. A dense cataract filled the pupillary space.

Operation: May 16, 1932. After subconjunctival adrenalin at "9, 12, and 3 o'clock," the pupil dilated roundly, the anterior adhesion pulling away from the corneal scar. A slanting keratome incision was made in the cornea. Some cortex escaped, the rest was milked and syringed out. The pupil was round and black at the end of the operation. A binocular bandage was adjusted.

On June 2, with +12.00 D.sph. ⊂ + .50 D.cyl. axis 90°, vision was 6/7.5 partly. The pupil was round, and there were no remnants of lens substance in the pupillary space. The corneal scar at the site of the penetrating wound was free from adhesion.

Case 4. M. N., aged 18 months, was first seen March 18, 1932.

History: The baby did not observe objects and at 6 months of age was taken to an oculist, who made a diagnosis of congenital cataract. Three operations were performed on the left eye and one on the right eye, all before the child was nine months old. The parents thought the left eye was the more improved, but the child still bumped into chairs and other objects. The father had had four operations on his eyes in childhood for

cataract. The paternal grandfather was similarly afflicted.

Examination: Dense pupillary membranes were present in the center of each pupil. Evidently some lens substance had been absorbed, the remainder caught between layers of thickened lens capsule. Nystagmus and alternating strabismus were present.

Operation: Left eye, June 22, 1932. Under general anesthesia, a subconjunctival injection of adrenalin 1/1000 was made at "9, 12 and 3 o'clock," near the limbus. While dilatation was obtained, it was not as complete as had been observed in previous cases. After waiting about fifteen minutes another injection of adrenalin was made at "12 o'clock." This also did not fully dilate the pupil. The keratome incision was made approximately over the pupillary border of the iris above. Capsule forceps were introduced through this incision. The membranous cataract was grasped and pulled out piecemeal. The pupil was black and clear. One percent atropin was used and a binocular bandage applied. Two days later the eye showed very little reaction. Five days following the operation, there was very little circumcorneal redness and the aqueous appeared clear. The patient was discharged on June 30, and one week later reported with photophobia, redness, and shallow anterior chamber. The aqueous appeared turbid. No cortical remnants were visible. The condition was thought to be a subacute postoperative iridocyclitis. Atropin 1/2 percent was prescribed; hot packs; injection of 2 c.c. milk intramuscularly. On the following day the condition was the same; the pupil was not dilated and a subconjunctival injection of 1/2 percent atropin with adrenalin was given. This had no effect on the pupil. Tension was 47 (Schiötz). The apparent turbidity of the aqueous proved to be a moderate corneal edema, and the iris was now seen to be ballooned up. Diagnosis: secondary glaucoma—iris bombé. A Fuchs's transfixion operation was performed by Dr. L. W. Roth, the iris being slit through both on the temporal and nasal sides.

Improvement followed, and the tension fell to normal. Three days later the patient was discharged from the hospital.

As the operated eye was fixing (the fellow eye turning in 25 degrees), it was presumed that it was now the better-seeing eye.

Case 5. F. F., aged 20 years, was first seen January 28, 1932.

History: Cataracts had been present since birth. Right eye had been operated on when the patient was very young. One brother and one sister had congenital cataracts; one sister was free from ocular defect.

Examination: Vision, O.D. = 6/80; O.S. = Fingers at 1 ft.

Nystagmus was present. The right eye was aphakic, with a few fragments of lens material seen, peripherally, behind the iris. In the left eye the pupil was round and semidilated, with a dense, flocculent, uneven, cataractous mass in the pupillary space. The periphery of lens was clear.

Operation: Left eye, April 4, 1932. Pupil dilated widely by subconjunctival injection of adrenalin, above. A keratome incision was made through the cornea, 2 mm. from the limbus. Capsule forceps and hook were used to remove the lens material. The eye was irrigated with an irrigator. Atropin was used and binocular bandage applied.

The convalescence was uneventful, except that the pupil contracted in spite of the daily use of atropin. On April 18, with +8.00 D. sph. Vision = 6/50. Vision was probably not better in this case on account of the nystagmus.

Case 6. L. H., aged 19 years, a white male, was first seen July 28, 1932.

History: The right eye had been struck by a glancing bullet in a shooting gallery 8 years ago. Cataract developed. The eye had been painful for the past week.

Examination: There was a corneal scar at "4 o'clock" near the limbus. The lower portion of the cornea was faintly cloudy and had several large bullæ. The pupil was round and there was a dense fibrous (?) mass in the pupillary space. X-ray revealed a small opaque foreign body in the right eye, localized 2 mm. above the horizontal plane, 3 mm. temporally and 7-1/2 mm. behind the center of the cornea. An electromagnet produced no reaction and the foreign body was believed to be nonmagnetizable. The corneal bullae were opened from time to time, the epithelium curetted and mild caustics applied in an attempt to promote satisfactory epithelialization. These painful vesicles have recurred at intervals, however.

Operation: October 21, 1932. After subconjunctival injection of adrenalin at three points, the pupil dilated quite widely above, but remained flattened at "4 o'clock," the site of the corneal scar. A slanting keratome incision was made within the pupillary border. The membrane and hard pieces of lens substance were grasped with forceps and a few pieces removed. A fibrous band, firmly adherent, was grasped with forceps, drawn slightly forward and cut with scissors inserted into the wound. The anterior chamber was irrigated with saline. In spite of a great deal of manipulation, with frequent insertions of instruments into the anterior chamber, the pupil remained fairly well dilated.

On November 17, 1932, with +10.00 D. sph., vision = 6/50. An x-ray examination showed the presence of an intraocular foreign body, as before, probably behind the iris at "four o'clock." The corneal bullae, having recurred, were completely removed including Bowman's membrane and several layers of the cornea. The outcome of this operation (performed November 21) cannot at this writing be stated.

It would be presumptuous to state that all cases of congenital and early adult cataract should be operated upon according to this new procedure. There are some pupils, especially in cases of

congenital cataract, which are simply undilatable by any known method. Perhaps the safest procedure in such cases is to perform a preliminary iridectomy and later a through-and-through discission (Ziegler).

With greater knowledge of the structure of cataractous lenses gained through biomicroscopy a shrewd guess may often be hazarded as to the probable reaction of a juvenile cataract to the needling operation. For some of these cases it would seem wiser to adopt the procedure under discussion as the first measure rather than to resort to it later after repeated discissions had failed.

Beaumont building.

THE OCULAR DISTURBANCES IN EPIDEMIC ENCEPHALITIS

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The ocular manifestations of epidemic encephalitis are of particular importance, for many of the diagnostic signs consist in a disturbance of the functions of the eyes. An ophthalmologist has the opportunity to study the ocular phenomena in lethargic encephalitis as well as the neurology of the ocular movements. Furthermore, since stramonium and other drugs of the belladonna group are used in treatment of the disease, the ophthalmologist may be called upon to relieve some of the visual disturbances produced by these drugs. This manuscript and subject matter has been prepared from the Central State Hospital, Indianapolis.

Lethargic encephalitis, or epidemic encephalitis, has been considered since 1917 to be a new disease. Von Economo[1] in 1917 directed the attention of the medical profession to the syndrome of fever, ocular disturbances, disorders of motility, of sleep, and of behavior as a new disease entity under the name of lethargic encephalitis. It seems that this syndrome had been described previous to von Economo's time, but differently and under other names.

Older physicians had not recognized the epidemic features. Since von Economo's first writings appeared on this subject, the disease has been reported from all parts of the world.

The symptoms of lethargic encephalitis may be extremely varied due to the possibility of widespread involvement of the nervous system, and will depend upon the part of this system affected. They may be brought about either by destruction of portions of the nervous system, with subsequent loss of corresponding functions of the body, or by the exaggeration of normal physiologic bodily actions from the loss of control over the affected parts by the higher centers of the brain. Some of the ocular phenomena may be due to structural changes in the basal ganglia, and in the nuclei of the oculomotor group. Other symptoms may be considered to be produced by destruction of centers higher in neural phylogeny than the basal nuclei and their nerve trunks, in which certain coordinating or volitional movements are disturbed. Likewise, psychic disturbances may be produced. The classical triad of symptom groups of this disease is: disorders of sleep, disorders of motility, and disorders of behavior.

Perhaps the simplest consideration of the ocular manifestations of lethargic encephalitis is by division into those encountered in the acute and in those in the chronic stage.

In the acute stage there occur various kinds of ophthalmoplegia. The third, fourth, or sixth cranial nerve trunks and their nuclei may be infiltrated or partially destroyed by inflammatory exudate, thus interrupting the function of these nerves, as evidenced by the classical symptoms of palsy of the corresponding muscles. However, there is rarely ever a complete paralysis of an isolated ocular motor nerve.

Instead of palsy there may be a spasm of one muscle or muscle group. Combinations of palsies of the oculomotor and other cranial nerves are common. Since diplopia is the chief symptom complained of in any form of recent ocular paralysis or spasm, this is one of the major ocular symptoms. It may be fleeting in character and present only for brief periods. It may be elicited in various directions of the gaze, and its location may frequently change. It may also vary at different distances from the patient. Diplopia of such characteristics is not produced by paralysis of one muscle or group of muscles. It may be brought about by transient infiltration of the nerve trunk or nucleus; by spasm of the muscles from irritation of the basal nuclei; and by interruption of the function of some of the higher coordinating centers[2]. Spasm or paralysis of convergence are rare neurologic findings in any disease, but may be encountered in lethargic encephalitis. They may be present in either the acute or chronic stage of lethargic encephalitis. The diplopia may disappear entirely after the first few days of illness. On the other hand it may persist and be one of the sequelae in the chronic stage.

Ptosis is present in over half of all patients at some time during the acute period, being the most common ocular manifestation[3]. It may be unilateral or bilateral, more frequently the latter, and present to any degree. Recovery usually occurs. Normal position and control of the upper lids have generally been regained before the disease has passed into the chronic stage. Ptosis frequently is present independently of other symptoms of disturbance of the third cranial nerve. This is considered to be due to the superficial position of this portion of the third-nerve nucleus, which renders it profoundly affected by toxic substances and inflammations which do not extend to the more deeply placed structures.

Defects in the movements of the pupils during the acute period of the disease are to be ascribed to disturbances of the functions of the third cranial nerve, paralysis of the constrictor fibers of the pupil being the most common disturbance. There may be anisocoria due to unequal involvement of the right and left third cranial nerves. The shape of the pupils may be distorted. The Argyll Robertson pupillary phenomenon is very seldom found in the acute stage of lethargic encephalitis. If it is discovered, one would have cause to suspect the existence of this phenomenon previous to the onset of the disease in question, and one would need to rule out syphilis of the central nervous system. The Argyll Robertson phenomenon may be encountered more often in the chronic period of the disease[4].

Nystagmus and nystagmoid movements are usually not elicited until the disease is either at the close of the acute period or in the chronic stage.

Fundus disturbances have not been recorded nearly so often as one would expect to find in the voluminous literature upon this subject. Some writers even go so far as to state that if swelling or hyperemia of the optic nerve is found, the physician should suspect some disease other than lethargic encephalitis to be present. This is rather an extreme view to take in a disease of such protean manifestations. Several observers (Spiller[5], Brown[6], Rothenberg[7]) have reported finding various degrees of hyperemia of the optic discs, even to the degree of choked-disc. It is not unreasonable to believe that such a condition may occur. No cause has been given why the optic nerve can not be invaded as well as any other part of the central nervous system. Interstitial optic neuritis, peripheral optic neuritis, and retrobulbar optic neuritis have been reported with later discoloration of the nerve head and reduction of vision.

As the acute symptoms gradually abate the disease passes into the chronic stage, and there then remain various physical defects as sequelae of the disease. The ocular symptoms are to a great degree a continuation of those symptoms encountered during the acute period, but while common in the acute stage are comparatively rare in the postencephalitic stage. A few patients make a complete recovery in all respects.

The ocular abnormalities of the

chronic stage can be discussed under the following headings: (1) disturbances of the extraocular muscles; (2) disturbances of the pupils; (3) fundus changes; and (4) psychic disturbances.

Disturbances of the extraocular muscles include ptosis, ocular-muscle paralysis, disturbances of the disjunctive movements of the eyes; spasm of groups of muscles (oculogyric crises); nystagmus; and changes in the functions of the orbicularis oculi.

Ptosis may be unilateral or bilateral and of unequal degree. It may be evident in the chronic stage only after fatigue or mental excitement. In the Ministry of Health Report, No. 11[8], ptosis occurred in fifty percent of 1152 cases at some time during the disease. The majority recover control of the levator muscles within one year from the onset so that finally only one half of one percent to three percent have ptosis remaining as a permanent deformity. It would appear that during the chronic stage of the disease ptosis is the result of infiltration of the third-nerve nucleus or of the fibers as they pass out from the surface of the brain. When ptosis is present there usually is paralysis of some of the other muscles innervated by the third nerve.

Paralysis of an isolated ocular muscle is rarely encountered. When this does occur the internal rectus seems to be the muscle most frequently involved. Ophthalmoplegia interna has been recorded. Paralysis of accommodation has likewise been noted, in some cases the pupillary muscles not being disturbed.

The writer once examined an adult male (a physician) who gave the history of a mild attack of encephalitis several years previously. There was a flattening of the face and cheek muscles and a mild Parkinsonian expression. He stated that he had been troubled by excessive salivation for several years. There was an unequal accommodation of the eyes. Both eyes were used for distant vision, and one eye for near. Refraction under scopolamine cycloplegia disclosed an equal anomaly of refraction with corrected vision 6/6 for each eye. After the effects of the cycloplegic had passed away the accommodation-near-point measurements were identical with those before its use. There were no ocular anomalies other than the unilateral paresis of accommodation.

Oculogyric crises. Paroxysmal spasmodic conjugate deviations of the eyes may occur in any direction of the gaze and is peculiar to the Parkinsonian form of lethargic encephalitis. The eyes may be fixed in any direction of the gaze, but they are usually directed upward. The attack may be prompted by any psychic excitement, and for this reason mild degrees of oculogyric crises may be mistaken for functional disturbances of an hysterical type. The patient is conscious of the condition and is unable to control or terminate the attack which may last for any length of time varying from a few minutes to several hours. The occurrence of the oculogyric crises indicates that the disease process is active. Disorders of behaviorism may be associated with the oculogyric crises. Conjugate deviation is rather constantly accompanied by fluttering or involuntary forced closure of the eyelids[9]. Attacks of forced conjugate deviation frequently accompany general attacks of increased rigidity of the entire body when there is an abnormal poverty of movement, or total lack of power to move and to complete the act which has been initiated.

The location of the lesion which produces the phenomenon of oculogyric crises has been debated, but there seems to be no general agreement upon the subject. By some it has been thought to be in the basal ganglia; in the striopallial system; in the anterior part of the corpora quadrigemina; while Jelliffe has endeavored to work out the cause of the seizures to be a combination of organic lesions and psychogenic disturbances. It must be remembered that emotional stress or fatigue brings on many attacks, that they are overcome by rest, and that marked disorders of behavior may be associated with the oculogyric attacks.

In 1926 the writer was consulted by a white male, aged twenty years, who complained of nervousness and a tendency of the eyes to roll up and become fixed. The childhood history was unim-

portant. At the age of fifteen years he suffered from an attack of influenza. During the time of this illness there was fever, some lethargia and bilateral ptosis. Diplopia was noticed for two or three days. Recovery from this acute illness was prolonged for several weeks. He soon afterward became nervous and irritable, and had some difficulty in speech. The diplopia did not reappear, and the ptosis corrected itself soon after he became afebrile. The voice impairment consisted in a stammering or scanning speech. It was nearly two years after the acute attack had passed that he began to be annoyed by having the eyes directed forcefully upward and to the right, and to remain fixed in that position for several minutes at a time. These attacks would occur at irregular periods of the day and seemed to be induced by any form of mental excitement. The patient suffered an attack while in the examiner's office. His weight had been reduced by thirty pounds in six months. He had a Parkinsonian expression, was troubled by excessive salivation, and some photophobia. Central vision was 20/15 for each eye. The accommodation near-point was 14 cm., convergence near point, 8 cm. There were no pupillary abnormalities and no pathology of the fundus. The visual fields were normal. Conjunctive and disjunctive movements of the eyeballs disclosed no abnormalities. This patient gradually became more and more spastic and died two years later.

In the fall of 1925 the writer was consulted by a white male, aged 38 years, complaining of diplopia, headache, inability to read, and of intermittently blurred vision for distance and near. Ten months previously he had had an acute illness, the essential features of which were, fever, slow pulse, marked lethargia, ptosis, and diplopia. The acute symptoms subsided after several weeks. There remained a Parkinsonian expression, infrequent blinking, intermittent diplopia, salivation, a tremulous voice, and moderate spasticity of the extremities. The gait was not particularly altered except that it was slow and deliberate. Central vision (uncorrected) was 20/50 and 20/30. Corrected vision, with compound myopic lenses, gave 20/15 for each eye. Accommodation near points were: right, 25 cm.; left, 45 cm. During the following year the accommodation near points receded to 50 cm. for each eye, and at other examinations would vary as much as 25 cm. If the tests for convergence were repeated several times the muscles would tire so that the near point receded to as much as 30 cm. from the plane of the face. There was no history of oculogyric attacks. The patient was examined several times during the following year. Diplopia was occasionally elicited in the fields of action of the right superior, internal, and inferior recti muscles, and of the left superior oblique muscle. Upon other examinations diplopia could not be demonstrated. The patient gradually became more and more spastic and died in the early part of 1927.

Disturbances of the disjunctive movements are rarely encountered, but when present are a cause of very annoying diplopia. In 1924 the writer was consulted by a patient who was in the late forties. He had been employed as a railroad conductor until eight months before when he was stricken with an influenza-like disease. There were drooping of one upper eyelid, diplopia of variable severity, and stupor. When he recovered from the stupor the ptosis gradually corrected itself, but the diplopia persisted. There was no history of oculogyric attacks nor of psychic disturbances. He had an expressionless face and no other sequelae besides heteronymous diplopia which increased in degree as one approached the patient. The diplopia presented the same findings when tested in the right and left fields. The monocular rotations were of normal extent. This patient certainly suffered from paralysis of convergence.

Nystagmus is not commonly encountered in lethargic encephalitis. When it is present it is usually during the chronic period of the disease. It may be of varying degrees at different times of the day, and is often aggravated by mental excitement and ocular effort. True nystagmus should not be confused with

nystagmoid movements. The presence of nystagmus in chronic epidemic encephalitis would indicate that the disease was progressive.

Disturbances of the orbicularis oculi muscles are often seen in the chronic form of epidemic encephalitis and may consist of twitching or fluttering movements of the eyelids, so that there is a rather continual irregular tremor of the lids. Severe blepharospasm may also be seen, and this appears to be in direct relationship to the time and degree of spasm of other parts of the body. There may be disturbances in the blinking of the eyelids. Many patients have excessive blinking, while on the other hand an occasional patient will have retarded blinking and a staring expression about the eyes. In the comparatively small number of patients afflicted with lethargic encephalitis that the writer has been privileged to examine, the von Graefe lid has not been discovered, and no record of it has been observed in the literature upon this subject.

Pupillary disturbances in the chronic stage of lethargic encephalitis may consist of the presence of the Argyll Robertson phenomenon, or in the pupils' being altered in size, shape, and light response from disease of the third-nerve nucleus or its connections. The pupils may become altered in size and shape three or four years after the acute stage has passed. One may be larger than the other. The Argyll Robertson pupillary phenomenon usually is not present earlier than one year after the acute stage. One may then occasionally encounter a classical Argyll Robertson phenomenon. That this pupillary phenomenon does occur in diseases of the brain other than syphilis is no longer disputed. It will be of intense interest and importance to know if pathological examination of patients who have had the Argyll Robertson phenomenon due to lethargic encephalitis will give findings similar to those reported by Sven Ingvar[10] in tabetic neurosyphilis of the brain. We must remember that the size of the pupil is the resultant of forces created by stimuli given to the pupillary muscles by the third cranial nerve and the sympathetic nervous system. In chronic epidemic encephalitis the sympathetic nervous system is in an irritable state. When the function of either the sympathetic system or the pupillary fibers of the third cranial nerve are altered a pathological condition will be present in the size and shape of the pupils.

Disturbances of the optic nerve and fundus are scarcely ever found in the chronic stage of lethargic encephalitis unless the pathology had been produced during the acute stage of the disease. Fundus changes found two or three years later consist chiefly in a paleness of the nerve head subsequent to a former acute neuritis. The condition is then no longer progressive. Perimetric findings would be in keeping with the kind and degree of injury of the optic nerve.

Ocular manifestations of psychic character in lethargic encephalitis consist chiefly of photophobia, blepharospasm, and the complaint of ocular pain and fatigue after any kind of eye work. Photophobia may be very annoying and not due to any local ocular pathology. The attack of photophobia may be so severe that the patient will be confined to a darkened room during the daytime, will be disturbed by electric lights in the home at night, and will venture forth only when heavy smoked lenses are worn. After a few weeks or months of this condition the photophobia will pass away and the patient will experience no disturbance of any kind from light or glare. Recurrent attacks of this nature are the rule. Blepharospasm accompanies photophobia unless it is a manifestation of disturbance of the orbicularis oculi, as has been mentioned. Ocular fatigue and pain are elusive symptoms. The patient may be an ocular invalid for several months, may not be aided by any refractive lenses, and then may have the disability abate rather rapidly. That the higher coordinating centers are invaded cannot be disputed, but such ocular manifestations seem to be closely associated with psychic upsets and are in accord with the psychic influences over the oculogyric crises.

The writer had the privilege a few years ago of observing a young woman

in the chronic stage of lethargic encephalitis who manifested many of these signs and symptoms. She was in the late twenties. In the latter part of 1924 she had been stricken with an acute attack of lethargic encephalitis. There were present excruciating headache, ptosis, diplopia, slow pulse, fever, lack of ability to move the voluntary muscles, pronounced lethargia and marked photophobia. Recurrent brief attacks took place one and two years later. Afterward, there were several periods of 2 to 4 months' time each when the patient was disturbed by an intractable photophobia, and ocular pain induced by use of the eyes, but each time she recovered and felt well after the attack had passed. At the present time she is in good health and has no ocular troubles.

Since stramonium has been found to be of value in the control of the symptoms of the disease, particularly the tremor and salivation, one should recall that certain ocular disturbances may arise from the drug itself. The amount given may be several times the usual pharmacopoeal dose. Its prolonged use does not induce permanent pathologic changes. Stramonium and the other atropine drugs when ingested will induce paralysis of the constrictor muscle of the iris and paralysis of accommodation. Dazzle and glare will be a source of annoyance due to the enlarged pupils. Paralysis of accommodation will interfere with the ability to read. Should the patient be presbyopic he will require a convex lens of 1.5 to 2.5 diopters' strength for near use. Should there be a refractive error of any great degree this also will necessitate the use of the proper lens correction.

The glare and dazzle from the enlarged pupils may be combated by the use of smoked glasses, or better, by the use of miotic drugs instilled into the conjunctival sac, of sufficient strength to constrict the pupil to the desired size. The miotic drugs will also partially overcome the paralysis of the muscle of accommodation. The problem will have to be met according to the needs of each patient.

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STUDIES OF RETINOPATHIES

I. Diabetes mellitus

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Of one hundred cases of diabetes mellitus, 38 percent were characterized by sclerotic and hypertensive manifestations in the retinal vessels, 30 percent by retinal vascular sclerosis only, and in the remaining 32 percent there were no evidences of vascular or tissue involvement in the retina. From the Ophthalmological and Third (N.Y.U.) Medical Divisions, Bellevue Hospital, and the Departments of Ophthalmology and Medicine, University and Bellevue Hospital Medical College, New York University, New York City.

1. Correlation of certain retinal states with age, duration of diabetes, blood pressure and urinary findings.

A review of the literature on retinal lesions occurring in diabetes mellitus shows the present tendency to consider such retinopathy to be influenced, if not precipitated, by factors other than the presence of hyperglycaemia.

From 1856, when the first case of retinopathy in diabetes was recorded by von Jaeger[1], until the present, the question of a retinopathic entity due to diabetes has remained unsettled. Two years after von Jaeger, Desmarres[2] described retinal lesions in diabetes closely resembling those found in Bright's disease and stressed the presence of glycosuria without albuminuria or casts. He concluded that albuminuria had preceded glycosuria. Noyes[3] in 1869 showed an instance of retinopathy in diabetes in which renal disease could not be demonstrated. Lawford[4] was quite convinced that diabetes itself could cause a definite retinopathy though he did not establish its frequency. Williamson[5] claimed that less than 2 percent of diabetics with retinopathy showed absence of albuminuria. Lagrange[6] raised the percentage of retinopathy in diabetes to 25 percent and Hirschberg[7] felt that retinal changes were usually present when glycosuria had existed for several years. The opinions are seemingly opposed, yet there are suggestions of factors involved that apparently can be correlated when studied in their entirety.

The following study covers one hundred cases of known diabetes mellitus which were divided into three groups depending upon retinal findings. The grouping resolved naturally into one characterized by retinopathy (which is defined below); another, by sclerotic vessel changes alone; and a third in which neither was present. The three groupings were studied in respect to age, length of time that diabetes existed, the presence of hyperpiesis, and the urinary picture.

The relationship of duration of preexisting hypertension and kidney disease to the existence or severity of retinopathy in diabetes is left to another study.

We accept as criteria of retinopathy today the presence of hemorrhages and infiltrations into tissues[8, 9, 10, 11, 12]. It is conceded that the only true pathognomonic state of diabetes in the retina is lipaemia retinalis which, however, will be outside the scope of this paper. The retinopathy of diabetes manifested by a few punctate hemorrhages unqualifiedly unassociated with pathology other than glycosuria is so questionable an entity that we prefer to leave it in the realms of hypothesis at present. We have not seen such a case.

The correlation of retinal findings and certain laboratory data necessitate, first, an agreement upon criteria for the acceptance of manifestations of sclerosis and arterial hypertension. The significance of "tarnished-silver" exudate and cotton-wool exudate (or degenerated area) must await further biochemical elucidation[13].

The phenomenon of the loss of vessel translucency, where artery crosses vein, has been stressed by Pines[14] as occurring in every case of diabetes. He has watched this and feels that though it invariably occurs in such states, it also occurs frequently in all states except the normal. Hence, it probably may be

looked upon as a confirmatory sign of a pathological process.

Broadening of the arterial reflex stripe (giving the coppery appearance), its dotting and irregularities, are attributed to sclerotic and atheromatous processes affecting the vessels[15, 16, 17, 18, 18a, 19, 19a]. Increased brightness, according to Friedenwald[20], has no particular significance, unless occasional and contrasted with other light reflexes. The irregularity of the lumen's contour is interpreted as a sclerotic process affecting the medial-vessel strata and is irrespective of hypertension[14]. Its presence is indicative of a generalized vascular sclerosis, even though it may not usually be seen with the ophthalmoscope, as has been shown by Martin Cohen[21] in microscopic sections.

The phenomenon of venous compression (and deflection) by an overlying arterial vessel is seen in sclerosis with and without hypertension and so refers to a confirmatory disease sign[22, 23, 24, 25, 26, 27, 28, 29]. Its production has been explained on both physical and tissue changes; the probability being that both play a part. Diminution (attenuation) of the caliber of the arterial system producing either the narrow, straight vessels of the larger branches or the tortuous twigs of the smaller ones is agreed upon as a manifestation of hypertension[30, 31, 32, 33, 34, 35].

Normally the retinal vessels bifurcate forming obtuse or right angles. Friedenwald[20] has called attention to this change of appearance in cases of hypertension through which the angulation becomes acute. Though few others have stressed this point, the findings in our records point to its importance, the angulation being present in 87.1 percent of the cases of hypertension and in only 10.7 percent of the cases without hypertension.

The character of the hemorrhages seen in our cases offers nothing by which to differentiate various pathological processes. Small-dot, streak, flame, subhyaloid, and vitreous hemorrhages have been observed. In the group of diabetics revealing vascular sclerosis and hypertension, the types of exudate covered the range from a yellow waxy character distributed mainly around the macular area to discrete spots of "tarnished silver," usually a combination being observed. White-gray, cotton-wool areas were also seen in combination with other types of exudate (15.1 percent) and were seen exclusively in two cases associated with chronic diffuse glomerular nephritis. This latter complication was observed in 10.2 percent of cases of retinopathy.

There is no adequate explanation for the various appearances of such occurrences[36, 37, 38, 39, 40, 41]. Hirschberg[7] described a central punctate retinopathy as a diabetic retinitis, though subsequent writers have felt that even if this type may be indicative of such an aetiologic basis it is not pathognomonic[42, 43, 44]. Friedenwald[42] expresses doubt of the existence of a true diabetic retinopathy. The impossibility of using the retinal picture as a diagnostic basis brought forth the following oft-quoted statement from Duke-Elder[45]: "It is to be expected that in a tissue so highly differentiated as the retina that different toxins acting upon it would produce pathological alterations of a closely related type, the nature of which would be determined rather by the structure itself than by the causal agent."

Edema of the retina and disc was observed in several cases, in all of which a coexisting hypertension was present. These same cases presented a retinopathy in which cotton-wool patches preponderated and either chronic diffuse glomerular nephritis or severe benign nephrosclerosis was associated. It is interesting to note that in several cases a relationship apparently existed between a rise or subsidence of blood pressure and the appearance or disappearance of retinal hemorrhages and albuminuria. In two cases that were followed over a period of two years, in which the retinal vessels manifested sclerosis alone for that period, a rise in blood pressure was coincident with retinal hemorrhages. The reverse was seen when retinal hemorrhages, present at the time of hypertension, disappeared with control of the latter and as long as this existed no new hemorrhages made their appearance, until the blood

Chart 1

Case No.	Group	Name	Sex	Age	Attrib. Duration of Disease in years	Wassermann	Urine						Blood Chemistry						R.B.C. Count in Millions	Haemoglobin %	Blood-Pressure Range
							Albumin	Casts	R.B.C.	W.B.C.	P.S.P. Test	Spec. Gravity Range	N.P.N.	Creat.	Sugar	CO_2					
1	1	EH	F	59	12	0	0	0	0	0	25/15	2–30	32	1.2	180				3.7	79	160/90 –130/84
2	1	TC	F	52	6	0	4+	+	0	+	20/15	10–20	40	1.6	211				4.9	89	180/110–148/80
3	1	SB′	F	60	5	0	2+	0	0	0	20/15	8–20	36	1.9	165	45			3.8	85	250/102–200/100
4	1	MP	F	50	15	0	0	0	0	0	25/20	3–18	34		140	48			4.6	85	192/100–166/88
5	1	ED	F	41	2	0	+	0	0	0	25/25	6–20	36	1.3	333	45			3.0	50	200/130–135/70
6	1	DA	M	47	7	0	0	0	0	0	3/10	4–18	31	1.2	235				4.6	90	162/110–110/80
7	1	FP	M	53	11	0	0	0	0	0	20/20	8–20	40	1.9	250	45			4.1	82	190/100–140/80
8	1	SFG	M	70	7	0	3+	+	+	+	20/15	8–20	69	2.1	211	46			3.8	70	160/100–120/70
9	1	TC	M	60	4	0	0	0	0	0	25/20	6–18	31	1.3	333	44			3.9	75	160/110–132/94
10	1	CD	F	55	1	0	+	0	0	0	15/10	16–40	34	1.6	254				5.9	94	180/110–140/106
11	1	EH	F	67	5	0	+	+	0	0	15/17	4–18	40	1.9	220				4.6	79	204/106–166/96
12	1	TF	F	50	8	4+	+	0	0	0	10/20	7–24	34	1.3	218				4.9	75	238/100–132/64
13	1	AR	F	52	7	0	+	0	0	0	25/20	8–22	32	1.1	C				4.4	80	208/110–144/66
14	1	EH	F	66	2.5	0	0	0	0	0	20/18	3–18	N	N	C				4.4	84	175/90 –140/90
15	1	JF	F	63	5.5	0	0	0	0	0	20/15	4–18	N	N	C				N	N	190/100–156/88
16	1	JL′	F	62	7	0	+	0	0	+	20/15	8–18	31	1.1	C				4.4	78	182/110–156/95
17	1	CJ	F	61	5.5	0	+	0	0	+	15/20	10–18	31	1.1	C				4.2	80	210/120–154/87
18	1	JL″	F	58	8	0	2+	+	0	0	15/18	8–14	38	1.6	C				5.0	80	204/110–170/92
19	1	NM	F	60	12	0	+	0	0	0	20/15	3–14	33	1.2	C				N	N	190/110–130/70
20	1	FB	F	55	10	0	+	0	0	0	20/25	2–14	33	1.1	C				4.8	80	220/110–158/98
21	1	SB″	F	45	5	0	3+	+	0	0	3/5	8–12	79	2.0	280				3.2	68	166/100–150/90
22	1	MF′	M	53	2	0	2+	0	0	0	25/25	3–18	N	N	C				N	N	180/100–170/90
23	1	EF	F	54	16	0	+	0	0	0	15/20	10–16	N	N	C				N	N	160/100–160/90
24	1	MF″	M	70	6.5	0	0	0	0	0	25/20	8–22	N	N	C				4.6	82	212/110–170/90
25	1	PG	M	66	13	0	+	+	0	0	15/10	6–20	N	N	C				N	N	204/90 –152/76
26	1	FG	F	51	4	0	+	0	0	+	25/25	2–16	31	1.2	C				4.6	84	200/120–140/105
27	1	ML	M	50	8.5	0	+	+	0	0	20/30	8–22	33	1.3	C				N	N	178/98 –144/88
28	1	MK	F	57	10	0	+	0	0	+	25/25	2–20	34	1.2	C				N	N	180/90 –168/76
29	1	HL	M	49	3	a/c	+	0	0	0	20/15	10–18	35	1.3	C				5.1	88	182/102–150/98
30	1	WF	M	56	3.5	0	2+	+	0	0	15/10	8–14	36	1.3	C				3.8	64	196/114–168/102
31	1	JT	F	60	12	a/c	+	0	0	0	20/15	3–14	36	1.3	C				4.8	86	190/110–160/92
32	1	PG	M	48	11	0	+	0	0	0	20/25	3–16	32	1.2	190				5.0	92	174/102–154/92
33	1	GM	M	56	9	0	4+	2+	+	0	10/2	6–10	53	2.1	188				3.6	72	196/114–172/110
34	1	KO	F	56	9	0	0	0	0	0	10/7	8–15	43		C				4.3	70	284/108–160/102
35	1	GS	M	57	8	0	0	0	0	0	30/20	4–22	31	1.3	C				5.2	91	184/108–158/98
36	1	MW	M	58	7	0	0	0	0	0	25/25	8–28	N	N	C				N	N	174/108–156/100
37	2	GG	F	50	2	0	0	0	0	0	25/25	6–28	32	1.4	130				4.5	80	140/80 –130/78
38	1	SF	M	70	8	0	3+	0	+	+	20/15	10–20	69	2.1	281	46			5.0	83	160/100–120/70
39	1	AM	F	66	5	0	3+	+	0	0	17/13	8–14	68	3.0	180				3.8	68	148/72 –1.0/70
40	2	CB	F	52	0.5	0	+	0	0	0	27/25	5–15	35	1.4	175				3.9	70	155/86 –138/76
41	2	RL	F	52	8	0	0	0	0	0	30/20	6–30	34	1.2	350	45			4.7	92	110/92 –136/88
42	2	LB	F	70	12	0	0	0	0	0	20/30	6–16	36	1.5	200				4.0	78	138/90 –120/80
43	2	MF	F	53	3	0	0	0	0	0	25/25	6–28	N	N	C				4.8	80	130/80
44	2	PP	M	60	5	0	0	0	0	0	20/25	10–28	N	N	C				4.2	78	150/80 –110/70
45	2	KS	F	66	7	0	0	0	0	0	20/25	8–24	33	1.1	C				4.4	80	147/84 –130/70
46	2	AW	F	56	7	0	0	0	0	0	25/25	10–28	32	1.2	160				5.0	84	134/80
47	2	KR	F	38	6	0	+	0	0	0	40/35	2–26	32	1.3	C				5.1	94	112/88
48	2	PW	M	67	1	0	0	0	0	0	35/15	10–24	36	1.3	180				4.2	80	125/72 –110/70
49	2	MB	F	57	0.5	0	0	0	0	0	40/25	3–20	N	N	C				4.6	86	138/78 –110/74
50	2	AZ	F	58	3	0	0	0	0	0	35/20	6–26	34	1.4	192				5.1	88	142/82 –136/78
51	2	JW	F	62	1.5	0	+	0	0	+	25/20	8–20	34	1.2	170				4.6	86	165/88 –125/76
52	2	AP	M	63	1.5	0	+	0	0	0	20/15	3–15	N	N	C				N	N	153/84 –120/70
53	2	EF	F	62	1	0	0	0	0	0	25/20	3–22	N	N	C				N	N	160/80 –140/80
54	2	FO	M	68	9	0	0	0	0	0	25/25	2–18	N	N	C				N	N	160/70 –120/45
55	2	NH	F	51	13	0	0	0	0	0	30/20	8–22	N	N	C				N	N	135/88 –100/70
56	2	AB	F	53	1.5	0	+	0	0	0	25/20	6–30	32	1.2	C				4.8	88	188/105–134/74
57	2	BF	M	60	8	0	0	0	0	0	N	N	N	N	C				N	N	138/80 – 94/64
58	2	MB	F	55	19	0	0	0	0	0	25/25	8–22	31	1.2	C				4.9	88	150/90 –124/76
59	1	MS	M	59	6	0	+	+	0	0	25/25	3–26	32	1.1	C				5.1	90	170/100–147/90
60	2	TM	F	49	3.5	0	0	0	0	0	30/28	6–18	32	1.2	C				5.0	92	140/96 –104/74
61	2	JH	F	59	11	0	+	0	0	0	N	N	N	N	C				N	N	140/82 –134/80
62	2	LM	F	35	9	4+	+	0	0	0	30/25	3–22	29	1.2	230				5.1	92	126/90 –110/58
63	2	LB	F	48	4	0	+	0	0	+	30/25	8–30	31	1.1	C				N	N	132/84 –126/80
64	2	CM	M	72	10	0	+	0	0	0	20/20	6–20	33	1.3	C				N	N	130/86 –122/80
65	2	GR	M	56	7	0	0	0	0	0	25/20	6–24	N	N	C				4.8	86	156/98 –132/80
66	2	LO	F	42	3	0	0	0	0	0	30/25	4–28	35	1.1	190				4.9	90	164/98 –130/72
67	2	AC	F	48	5	0	0	0	0	0	30/25	4–18	37	1.2	C				4.8	81	146/88 –132/72
68	3	AK	F	36	4	0	0	0	0	0	30/25	7–30	30	1.3	205				3.7	40	125/80 –100/60
69	3	DS	M	28	2	0	0	0	0	0	40/15	2–20	32	1.2	160				5.0	80	134/90 –128/80
70	3	BB	F	36	0.1	0	+	0	0	+	35/25	4–22	38		235				5.0	95	130/100–120/80
71	3	LC	F	26	0.1	0	0	0	0	0	35/30	3–30	32		180				4.8	75	128/72 – 90.55
72	3	EM	F	25	8	0	0	0	0	0	25/25	8–26	32	1.2	195				4.5	90	106/72
73	3	V′C	F	29	2	0	0	0	0	0	40/30	5–30	30	1.1	190				4.5	80	112/72
74	3	AE	F	46	1	0	0	0	0	0	30/25	4–24	32	1.1	160				4.4	80	156/110
75	3	JN	F	35	4	0	0	0	0	0	35/25	3–30	30	1.2	190				4.8	88	120/88 –105/80

Chart 1 (Continued)

Case No.	Group	Name	Sex	Age	Attrib. Duration of Disease in years	Wassermann	Urine						Blood Chemistry				R.B.C. Count in Millions	Haemoglobin %	Blood-Pressure Range
							Albumin	Casts	R.B.C.	W.B.C.	P.S.P. Test	Spec. Gravity Range	N.P.N.	Creat.	Sugar	CO_2			
76	3	LC'	F	33	5	0	0	0	0	0	45/15	2–28	N	N	C		N	N	130/78 –115/70
77	3	JM	M	45	0.5	0	0	0	0	0	25/25	4–20	N	N	C		N	N	124/90 –110/80
78	3	JL	M	42	3	0	0	0	0	0	30/15	8–20	33	1.2	C		5.2	98	125/85 –110/85
79	3	MS	F	42	2	0	0	0	0	0	25/30	4–18	N	N	C		N	N	122/80 –118/78
80	3	HR	M	52	17	0	0	0	0	0	25/20	2–18	35	1.3	C		5.0	92	140/80 –130/70
81	3	SR	M	38	1	0	0	0	0	0	40/25	1–20	28	1.0	C		5.0	94	132/80 –120/70
82	3	RF	F	45	1	0	0	0	0	0	35/22	3–22	N	N	C		N	N	132/72 –105/70
83	3	CS	M	25	0.5	0	0	0	0	0	35/35	8–26	33	1.4	250		4.9	90	135/90 –130/80
84	3	GF	M	28	1	0	0	0	0	0	30/22	5–20	N	N	C		N	N	120/74
85	3	EG	F	42	11	0	0	0	0	0	25/25	2–20	N	N	C		N	N	125/80
86	3	AG	F	13	2	0	0	0	0	0	40/35	1–30	28	1.0	C		4.2	86	80/55
87	3	FG	F	41	1	0	0	0	0	0	N	N	N	N	C		N	N	122/84 –110/64
88	3	JK	F	38	0.5	0	0	0	0	0	25/35	1–17	33	1.0	192	45	4.9	94	140/90 –120/80
89	3	JS	M	23	2	0	0	0	0	0	30/25	8–22	31	1.2	C		5.2	94	126/84 –120/80
90	3	JB	M	34	1	0	0	0	0	0	35/25	2–24	30	1.1	160		4.9	92	110/60 –110/60
91	3	EK	M	20	4	0	0	0	0	0	N	N	N	N	C		N	N	94/62
92	3	KK	F	28	14	0	+	0	0	+	45/15	2–22	30	1.0	C		4.8	86	130/82 –128/80
93	3	HH	M	32	8	0	0	0	0	0	30/?	10–30	33	1.2	280		4.1	74	142/88 –126/72
94	3	FS	M	32	0.5	0	0	0	0	0	N	N	N	N	C		N	N	122/64 –118/60
95	3	ZS	F	28	0.5	0	0	0	0	0	N	N	N	N	C		N	N	124/70
96	3	RG	F	32	1	0	0	0	0	0	35/15	3–30	32	1.1	185		5.0	92	128/64 –120/60
97	3	APG	M	36	3	0	0	0	0	0	40/20	8–26	N	N	C		N	N	130/70 –128/70
98	3	MK	F	28	6	a/c	+	0	0	0	35/30	2–28	32	1.0	C		4.6	89	126/64 –118/60
99	3	DP	M	43	7	0	0	0	0	0	25/25	8–30	N	N	C		N	N	140/82 –136/76
100	3	DT	M	50	4	+	0	0	0	0	20/25	10–24	37	1.3	190		4.9	90	142/78 –138/78

NOTES:

(1) N = known normal figures.
(2) C = hyperglycaemia controlled by insulin, diet, or both.
(3) + = presence as indicated.
(4) Specific Gravity: preceding figures—1.0(0)—omitted.
(5) Blood-pressure range: high and low systolic and diastolic during observations.
(6) Blood chemical figures taken for time when diagnosis, other than diabetic, definitively established.
(7) Phenolsulphonephthalein test figures: same as note (6).

pressure rose despite control efforts. A similar relationship was observed (two cases) between albuminuria and hypertension.

The majority of the cases appended have been followed over a period of two years. They represent the usual hospital and out-patient type and their common characteristic is that they are known diabetics, either frank or under control by diet and insulin.

The cases are divided into three general classes. The cases in group 1 are selected in so far as they reveal retinal pathology though no discrimination was allowed for types of pathology. With this is compared group 2, whose salient point is sclerosis of the retinal vessels, and group 3, cases without discernible changes in the vessels or retinal elements.

The average age of group 1 is 55.13 years, the average attributed duration of the diabetic state 7.34 years, and the average blood pressure range 194/109 to 154/92. Seventy-nine percent of this group manifested an albuminuria at one time or another and 13 percent revealed casts. The average age in the cases comprising group 2—those in which there is retinal-vessel sclerosis alone in the fundus picture—is similar 55.3 years) to that in group 1, but there is a drop in the average duration of disease and a most marked difference in the blood-pressure range 142/84 to 117/67. Albuminuria occurred in this group in 29 percent and casts not at all. Group 3, in which no retinal changes in either vessels or elements were observed, shows the lowest age, duration of disease, and blood-pressure-range averages and practically constant negative urinalyses for albumin and casts.

A consideration of blood-pressure averages in groups 2 and 3 places the range as commensurate with age average. Hence, in group 1, a factor is ob-

Chart 1a

Case No.	Retina: Hemorrhage	Exudate	Disc (edema or hyperaemia)	Copper color	Silver Wire	Vein Deflection	Banking	Dotting (arterial reflex)	Compression of vein	Translucency	Tortuosity	Aneurysms	New-formed blood vessels	Retinal Edema	Perivasculitis	Lumen Irregularity	Spasm	Angulation (artery branching)	Artery attenuation	Colloid Excrescences	Pigmentary Changes (Macula)	Tesselation (exaggeration)	Chorioidal Sclerosis (disease)	Notes
1	0	0	0	+	0	+	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	
2	+	+	+	+	0	+	+	+	E	L	+	+	+	+	+	+	0	A	+	0	0	0	0	Both inf. ret. nas. veins show aneurysmal dilatations and marked constrictions. Perivasculitis around one.
3	+	+	0	+	0	0	0	+	S	L	+	0	0	0	0	+	+	A	+	0	0	0	0	Tarnished-silver exudate; also cotton-wool. Hyperten; En. H.; R.S.R.; iiA. Visceroptosis.
4	+	+	0	+	0	0	0	+	S	L	+	0	0	0	0	+	0	A	+	0	0	0	0	Tarnished-silver exudate.
5	0	0	0	+	0	0	0	+	S	L	+	0	0	0	0	+	0	A	+	0	0	0	0	Mastoiditis; Meningitis. Died.
6	+	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	En. H.; R.S.R.; Tachy. parox.; A.S.
7	+	+	+	+	0	0	0	+	M	L	0	0	0	+	0	+	0	A	+	0	0	0	0	Cotton-wool areas; tarnished-silver exudate.
8	+	+	+	+	+	+	0	+	M	L	0	0	0	+	0	+	0	A	+	0	+	0	+	Cotton wool; incomplete "stars." Chr. glom. neph.; En. H.; R.S.R.; iiB. Died.
9	+	+	0	+	0	0	0	+	M	L	+	0	0	0	0	+	0	A	+	0	+	0	+	Ret. Prolif., O.D.; Central chorioret. O.U.; Old hemiplegia.
10	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	
11	+	+	0	+	0	0	0	0	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Tarnished-silver exudate; E.H.; R.S.R.; A.S.
12	+	+	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Conv. strab; Corneal macula O.D., A.S.; E.H; R.S.R.; iiA.
13	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	0	0	A	+	0	0	0	0	
14	0	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Incip. cataracts O.U.
15	0	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Incip. cataracts O.U.
16	+	+	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Rt. hemiplegia.
17	+	+	+	+	0	+	+	+	E	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Cotton-wool areas only.
18	+	+	+	+	0	+	+	+	M	L	+	0	0	+	+	+	0	A	+	0	0	0	0	Vitreous hem. O.D; Cotton-wool areas only.
19	+	+	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Sparse spots of yellow exudate.
20	+	+	0	+	0	+	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	
21	+	+	+	+	+	0	0	+	M	L	+	0	0	+	0	+	0	A	+	0	0	0	0	All types of exudates. Chr. glom. neph. Died.
22	0	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	
23	+	+	0	+	0	0	0	+	S	L	0	0	0	0	0	0	0	A	+	0	0	0	0	Manic-depressive psychosis.
24	+	+	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Incipient cataract O.U.
25	+	+	0	+	0	0	0	+	M	L	+	0	0	0	0	+	0	A	+	0	0	0	0	Tarnished-silver exudate.
26	+	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Hemorrhage coincident with highest hypertension.
27	+	+	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	+	Acute iritis O.D.
28	+	+	0	+	+	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	+	+	Exudate mainly yellow. One cotton-wool area.
29	+	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	+	0	0	0	0	Cholesterin deposits.
30	+	+	+	+	0	+	+	+	E	L	+	0	0	+	+	+	+	A	+	0	0	0	+	Chr. glom. neph.; En. H.; R.S.R.; iiB.
31	+	+	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	0	0	
32	+	0	0	+	0	0	0	0	L	L	0	0	0	0	0	+	+	R	0	+	0	0	0	
33	+	+	+	+	0	0	0	+	M	L	+	0	0	+	0	0	0	A	+	+	0	0	+	Cotton-wool areas only; Chr. glom. neph.; A.S. of aorta; R.S.R.; iiB.
34	0	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	0	+	0	Benign nephrosclerosis.
35	+	0	0	+	0	0	0	0	S	L	+	0	0	0	0	+	0	R	+	+	0	0	0	
36	+	0	0	+	0	0	0	0	S	L	+	0	0	0	0	+	0	R	0	0	0	0	0	
37	0	+	0	+	0	0	0	0	0	L	0	0	0	0	0	+	0	R	0	0	+	0	+	Myopic Chorioretinitis O.U.
38	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	+	A.S., Coronary sclerosis., R.S.R.; iiB., Benign nephrosclerosis.
39	+	0	0	+	0	0	0	0	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	A.S. heart disease.
40	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	O.D. blind; postoperative.
41	0	0	0	+	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
42	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	+	
43	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
44	0	0	0	+	0	0	0	0	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	Fine vitreous opacities.
45	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
46	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
47	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
48	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	+	0	0	
49	0	0	0	+	0	0	0	+	M	L	0	0	0	0	0	+	0	A	+	0	+	0	0	Incipient cataracts O.U.
50	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	+	0	+	+	
51	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	Albuminuria coincident with hypertension.
52	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	0	0	0	0	0	
53	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
54	+	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	Hemorrhage coincident with hypertension.
55	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
56	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	0	0	0	0	0	Albuminuria disappeared with subsidence of hypertension.
57	+	+	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	+	Circinate retinitis O.U.
58	0	+	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	+	0	0	0	0	Circinate retinitis O.U.
59	+	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	A	0	0	0	0	0	Hemorrhage coincident with hypertension. Right homon. hemianopsia 2 yrs. previously (Bl. P. 230/142). Benign nephrosclerosis.

Chart 1a (Continued)

Case No.	Retina																					Notes
	Hemorrhage	Exudate	Disc (edema or hyperaemia)	Copper color	Silver Wire	Vein Deflection	Banking	Dotting (arterial reflex)	Compression of vein	Translucency	Tortuosity	Aneurysms	New-formed blood vessels	Retinal Edema	Perivasculitis	Lumen Irregularity	Spasms	Angulation (artery branching)	Artery attenuation	Colloid Excrescences	Pigmentary Changes (Macula)	Tesselation (exaggeration)	Chorioidal Sclerosis (disease)	
60	+	+	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	Changes in O.D. only (slight).
61	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
62	0	0	0	+	0	0	0	0	S	L	0	0	0	0	0	0	0	R	0	0	+	0	0	Luetic retinitis.
63	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
64	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
65	0	0	0	+	0	0	0	+	S	L	0	0	0	0	0	+	0	R	0	+	0	0	+	
66	+	0	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	Hemorrhage coincident with hypertension.
67	0	0	0	+	0	0	0	+	0	L	0	0	0	0	0	+	0	R	0	0	0	0	0	
68	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	Secondary anaemia.
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
70	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
71	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
72	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
74	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
77	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
78	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
79	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
80	0	0	0	+	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
81	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	Loss of translucency occasional only
82	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
83	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	Cataracts O.U. matured in 6 weeks.
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
85	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
88	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
90	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
93	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
96	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	
97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R	0	0	0	0	0	
99	0	0	0	0	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	Loss of translucency occasional only.
100	0	0	0	+	0	0	0	0	0	L	0	0	0	0	0	0	0	R	0	0	0	0	0	

NOTES:

(1) + = denotes presence as indicated without qualifications as to extent, quantity, or severity.
(2) S = slight; M = moderate; E = extreme.
(3) L = loss of translucency.
(4) A = acute angulation of arterial branching. R = wide, right, or obtuse angulation.
(5) Cardiac diagnoses classified according to American Heart Association nomenclature.

Chart 2

Group	Age Average in yrs.	Average Attributed Duration of Diabetes in years	Percent of Cases with Albuminuria	Percent of Cases with Casts	Average Blood Pressure Range	Percent Hem.	Retina	
							Percent of Cases with Exudate	Percent of Cases with Sclerosis
1	55.13	7.34	79	13	194/109–154/92	76.9	57	100
2	55.3	5.77	29	0	142/84 –117/67	21.4	14.2	100
3	31.1	4.5	0.3	0	121/78 –118/74	0	0	0

tained for retinal changes in the consistency of a hyperpiesis.

In group 1, further analysis from the point of view of urinary involvement shows that 10.2 percent of the cases have anemia, 79 percent albuminuria, 13 percent casts, 15.5 percent a fixed specific-gravity range and 25 percent alterations in the ability to put out dye; 10.2 percent of them were properly identified as being complicated by chronic diffuse glomerular nephritis, and 7.7 percent as cases of malignant nephrosclerosis by means of additional kidney-function tests. These showed the most marked retinopathy. Of the remainder, the least that can be said of them is that they possess an essential hypertension or benign nephrosclerosis.

The number of cases in group 2 showing retinal hemorrhages (15 percent), may, at first glance, seem high. It was in this group that hemorrhages in association with transient hypertension were found. The retinopathy in this group was mild in comparison with group 1 and apparently belongs in the category of arterio-sclerotic retinitis, as an associated hypertensive state could not be proved. No blurring of the discs and no signs of hypertension were seen in this group but it included two cases of circinate retinitis.

Summary

In a study of one hundred cases of diabetes mellitus, the clinical signs of hypertension, retinal vascular sclerosis, and abnormal urinary elements are correlated, together with age and duration of the diseased state.

Thirty-eight percent of these cases (group 1) presented a retinopathy in which sclerosis and hypertensive signs in the vessels were practically uniformly present. Associated nephritic lesions appeared in 23.5 percent, of which 10.2 percent were classed as chronic diffuse glomerular nephritis, 7.7 percent referred to renal changes in nephrosclerosis. Seventy-two percent of group 1 were noted as having benign hypertension.

The average age for this group was 55.13 years and the diabetic state averaged 7.34 years.

The retinopathy seen in these diabetics did not conform to one clear picture, no entity having been established. The majority showed characteristics of hypertensive retinitis, both vascular and exudative. No relationship was seen between the presence of retinopathy and the severity of diabetes.

Thirty percent of the cases presented signs of retinal vascular sclerosis without other vascular or retinal changes. All of these (group 2) were free from renal disease and permanent hyperpiesis was absent. The average age in this group (55.3 years) was practically the same as in group 1, but the duration of the diabetic state was shorter (5.77 years).

The duration of the diabetic state was not, apparently, a direct factor in the production of retinal pathology.

The remaining cases (32 percent, group 3) showed no alterations in the retinal vessels or tissues. Blood-pressure ranges were entirely normal and the urinary pictures always negative (sugar excepted). Average age (31.1 years) and duration of diabetes (4.5 years) were lower than in groups 1 and 2. Group 3 was considered the control group.

39 Fifth avenue.

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NOTES, CASES AND INSTRUMENTS

OCULAR SYMPTOMS ARISING FROM INTRACRANIAL ANEURYSM OF BOTH VERTEBRAL ARTERIES*

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The following case of an aneurysm involving the intracranial portions of both vertebral arteries at the junction with the basilar artery is reported because: first; the patient's symptoms of double vision caused him first to consult an ophthalmologist, second; from the symptoms, a mistaken diagnosis of brain tumor was made, third; the condition is extremely rare. I have been able to find only one other case in which both arteries were involved; reported by Rawes[1]. Perrig[2] has given a complete review of the subject.

In December, 1909, Fred N. aged 47 years, consulted me on account of double vision. He was a strong well-nourished man; reflexes were normal and the general physical condition was negative. He had been well and strong all his life until ten years previous, when he began to have frontal headaches. About a year ago, this pain became localized more in the left occiput. It was constant and dull in character. He had taken headache powders practically every morning for the past ten years. Three months ago, he first had double vision, originally transitory but now constant. It was more marked when looking down. Venereal infection was denied.

* Read before the Minnesota Academy of Medicine, October 12, 1932.

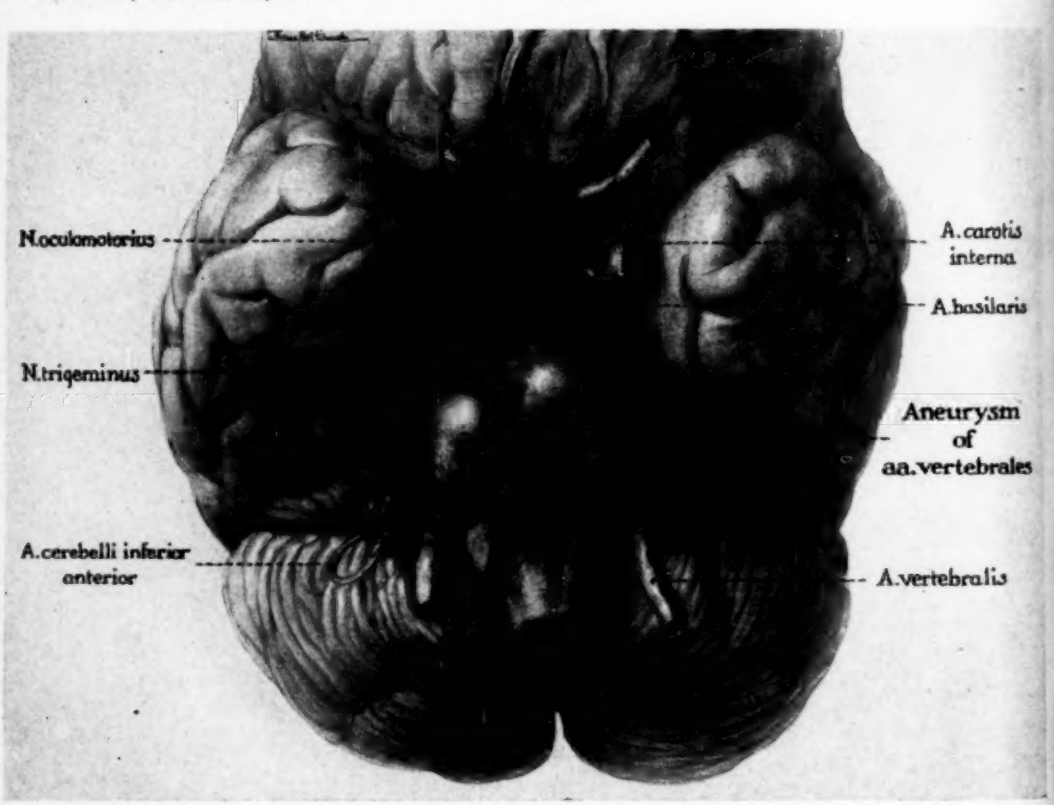

Fig. 1 (Spratt). Intracranial aneurysm arising from both vertebral arteries.

The vision in each eye equalled 6/6 minus. There was diplopia on looking down and to the left. (Patient became dizzy on making a sudden movement.) The left pupil was slightly dilated. Both pupils reacted to light and accommodation, the left being somewhat sluggish. The left optic disc was slightly pale. The retinal veins in each eye were dilated and tortuous. No blurring of the discs or hemorrhages were present.

In April 1910, the headaches had become more severe and constant, especially in the left occiput and parietal region. Vision was normal in each eye, diplopia was more marked. In July 19, 1910, besides the headaches, he had pain in the left eye, in the upper and lower teeth, the tongue and the left side of the head. This was a dull and constant pain and extended to the left occiput. The left external rectus muscle was completely paralyzed. The memory was now failing. He had been nauseated several times and vomited. The left side of the face was anesthetic; there was partial paralysis of the left side of the face and slight muscle pain. He was unable to detect odors and his sense of taste had diminished. The tongue deviated to the right side. The hearing was equal in both ears, a watch being heard at four inches; Weber located on the left side; in walking he tended to fall toward the left. The fields of vision showed concentric contraction. The veins in the left optic disc were considerably enlarged. There was horizontal nystagmus, especially on looking to the left. The knee jerks were more active on the right side than on the left. Pain was so severe that the patient threatened suicide.

On July 19, 1910, I did a palliative sub-temporal decompression after the method of Cushing. An opening 4 x 6 cm. was made in the bone, and on opening the dura, there was an excess of spinal fluid and bulging of the brain. The veins of the arachnoid were much enlarged. The wound healed *per primum* and the patient had considerable relief from the pain. This was only temporary and on August 12, 1910, I made a cross bow incision after the method of Cushing so as to expose the cerebellum. There was much bulging of the dura and the vessels were much injected. On incising the dura, a large quantity of fluid spurted out. The arachnoid was edematous. The patient died suddenly on the table. An autopsy was performed, and on lifting the brain from its bed, it was found that the vertebral arteries, at the junction of the baselar were much enlarged on each side, the width of the aneurysm being 3.5 cm. by 5 cm. The appearance of the sac resembled much the hind quarters of a fat pig. The baselar internal carotids communicating, were enlarged and convulated, but not a part of the aneurysm.

1231 Medical Arts building.

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AN IMPROVED HOLZER PRIESTLY-SMITH TAPE FOR RAPID AND ACCURATE MEASUREMENTS OF STRABISMUS

M. E. Smukler, M.D.
PHILADELPHIA

The Holzer Priestly-Smith tape is modified as follows: Two silk cords 3/16 inch thick are used instead of tape. One cord is permanently tied on the revolving metal rings fastened to a strabismometer and a concave retinoscope. The other cord has one end attached to the revolving ring on the strabismometer and the other end attached to a finger ring, through which passes the measuring tape that is fastened to the ring on the retinoscope. Each cord is long enough to make the distance between the strabismometer and the retinoscope 60 cm., and between the strabismometer and the finger ring 60 cm.

The weight of the metal box containing the measuring tape is just sufficient to hold the tape taut and easy to ma-

nipulate. The degree of deviation for near and distance may be measured.

Method of using tape: Examination of a case of monocular convergent strabismus of the left eye. Measurements

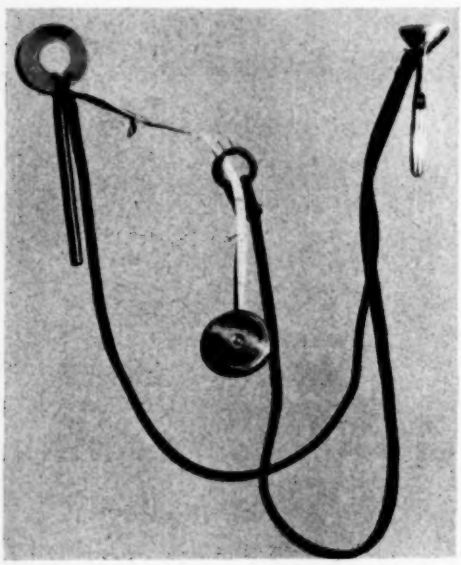

Fig. 1 (Smukler). Improved Holzer Priestly-Smith tape for rapid and accurate measurements of strabismus.

are made in a dark room with a fairly brilliant light situated behind and above the patient, and a concave retinoscope. This gives a bright reflex on the cornea, so that the outline of the pupil and the relative position of the corneal reflex with reference to the pupil can be much better seen. The strabismometer is held against the right cheek below the fixing eye of the patient. The observer holds the retinoscope in the left hand, so that the silk cord between the retinoscope and the strabismometer is taut. He then reflects, with the retinoscope, the image of the light behind the patient, into the fixing eye, while the patient is directed to fix the mirror. Through the sight hole in the mirror, the observer notes the exact position of the corneal reflex in the right eye. The retinoscopic mirror is now turned to the left eye while the patient is still fixing the mirror with the right eye. It will be observed that the reflex on the left cornea is situated eccentrically outward, showing that the left eye deviates inward. The patient is next directed to follow with his fixing eye the index finger of the observer's right hand on which the finger ring has been placed. (Silk cord between the strabismometer and finger ring is held taut by the index finger.) The right hand is gradually moved horizontally outward, while the observer is looking through the retinoscope sight hole, until the left eye has rotated outward enough to bring the reflex to a similar position it occupied in the right eye when this eye was fixing the mirror. When this point is reached, the tape is pinched. The pinched part of the tape marks the degree of deviation. One centimeter on the tape equals one degree of deviation.

In measuring the degree of squint for distance, have the patient fix on an object at 20 feet distance or more. If the patient is a very young child, have the nurse or parent hold an attractive object 20 feet or more from the patient.

1940 North Broad street.

CUL-DE-SAC FORCEPS

Forceps for placing medication in the upper cul-de-sac

M. E. Smukler, M.D.
PHILADELPHIA

The forceps simplifies the procedure for placing a pledget of medicated cotton in the upper cul-de-sac, and later

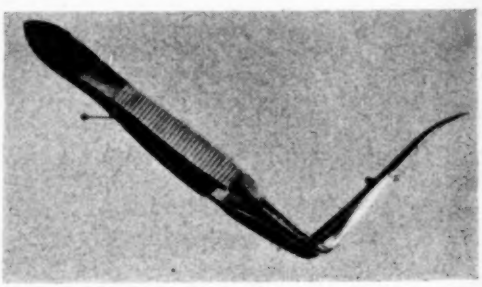

Fig. 1 (Smukler). Cul-de-sac forceps.

removing the pledget without increasing the discomfort of the patient.

This procedure is often useful in acute iritis and acute glaucoma, as the

action of the drug is greatly increased when a few drops are put on a small pledget of cotton and inserted into the upper cul-de-sac, for about five minutes.

The forceps (five and one-half inches over all) has a cross acting handle with flat blades placed at ninety degrees to the handle. The flat sides of the blades are shaped to follow the curve of the globe. The sides of the blade are flat, flexible and thin, having the so-called butter edges on the outer side and on the round tips of the blades, so as not to injure or catch on the conjunctiva as the flat sides of the blades pass smoothly over the conjunctiva into the cul-de-sac. The opposing edges at the curved distal part of the blades are serrated so that the medicated cotton will not slip backward between the blades as the cotton is being inserted. These sides also greatly facilitate the secure grasp of the cotton when removing it.

1940 North Broad street.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

CONGRESS OF THE PAN-AMERICAN MEDICAL ASSOCIATION

March 21-25, 1933

The fourth congress of this association was held at Dallas, Texas, March 21 to 25, 1933. The three congresses preceding this were held at Havana, Panama, and Mexico; and, in 1893, before the Spanish-American War, such a congress had been held in Washington. At each congress there has been a section on ophthalmology. At Dallas the chairman of this section was Dr. Thomas B. Holloway, of Philadelphia. The secretary was Dr. Conrad Berens, of New York. The president of the congress was Dr. J. O. McReynolds, of Dallas, and the president of the association was Dr. Francisco M. Fernandez, of Havana. Dr. Fernandez was formerly engaged in the practice of ophthalmology, but in recent years has devoted his attention to public health.

Leber's disease, hereditary optic atrophy

Dr. Arthur J. Bedell, of Albany, New York, read a paper on this subject, illustrated by photographs of the fundus oculi. The pictures showed the pallor and indistinct outlines of the optic discs. There were also field charts illustrating the central defect of the fields. Blindness usually appeared quite suddenly, sometimes vision was partly restored. But generally there remained in the end an absolute central scotoma. The hereditary character was illustrated by a family tree, including five generations. He said the nature of the case might be overlooked, unless it was followed throughout its course.

Tuberculosis of the cornea

Dr. Enrique Avalos, of Guadalajara, Mexico, reported a case, believed to be primary. The diagnosis was based on the appearance of a typical tubercle on the surface of the cornea; with no discoverable evidence of tuberculosis in any other part of the body; and on the subsequent healing under treatment with old tuberculin.

Spasm of accommodation

Dr. Louis Bothman, of Chicago, read a paper on this subject. He gave a wide review of the literature, and a broad view of the condition, based on extended statistics and reports of cases.

Glaucoma

Dr. Edward C. Ellett, of Memphis, drew lessons regarding this disease, from his large experience with it. He felt that when untreated, or inadequately treated, the end was certain blindness. Even cases that seemed to be held in check for a time by medical treatment, if they lost ground so that they required operation, had a bad prognosis. There was no operation that could be relied upon to check the disease, when done as a last resort.

Intraocular tension

Dr. Juan Luis Torroella, of Mexico, had previously observed and pointed out, "The intraocular tension is not the same in the anterior and posterior chambers, either from a theoretical, or a practical point of view." On account of the difference in curvature, between the surfaces of the cornea and sclera, the tonometric observations were not comparable, and the coefficients of elasticity of these membranes were different. He described a special modification of tonometry to meet these difficulties. He considered the eye divided into two parts; an anterior containing the aqueous, and a posterior the vitreous. These were separated by a strong membrane, the ciliary processes, the zonule of Zinn, and the crystalline lens, enclosed in its anterior and posterior capsule. The fact that Petit's canal could be inflated, by air blown into it, opposed the idea that the fibers of the suspensory ligament permitted the free passage of fluid between them; and the idea must be rejected that the membrane between the aqueous and vitreous

permitted liquid interchanges between them. Tables were given showing differences between the anterior and the posterior tensions of the eye; and cases illustrating the condition. Two cases were cited in which increased anterior tension did not impair the results of cataract extraction; and permitted operative relief of severe glaucoma symptoms.

Etiology of glaucoma

Dr. J. F. Hardesty, of St. Louis, said that doubt was expressed that primary glaucoma was a disease per se, and overproduction of aqueous was considered to be as important as obstructed outflow, in the etiology.

The result of microscopic examination of the ciliary body in many eyes with glaucoma simplex was summarized and slides presented to show that a condition of increased capillary permeability had probably existed.

Clinical experiments and charts were presented to show that adrenalin, pilocarpin, physostigmin, pituitrin, thyroid extract, and alkalies given systematically, lowered the intraocular tension in primary glaucoma. There was no change in the size of the pupil or in the systemic blood pressure, and the belief was expressed that primary glaucoma was a local manifestation, in a predisposed eye, of some systemic disorder, independent in the main, of the general blood pressure.

Visual field changes following division of the optic chiasm

Dr. Henry C. Haden, of Houston, Texas, reported a case in which, to give relief from pressure of a cranio-pharyngeal cyst, it was necessary to divide the optic chiasm in the median line. A careful study had been made of the subsequent changes in vision, the visual fields, and the changes that occurred in the color of the optic discs. Under pituitary feeding there had been marked improvement of the fields and central vision. The pallor appeared after some weeks, in the nasal quadrants of the discs; and extended until only a small sector at the upper and lower margins of the discs remained normal in color.

Changes in astigmatism

Dr. Edward Jackson read a paper on this subject which will be published in this Journal.

Influence of allergy and immunity on syphilitic ocular lesions

Dr. Alan Woods, of Baltimore, said the evidence regarding these influences was based on animal experiments and clinical observations. The tendency of early specific treatment to prevent the development of natural immunity was pointed out, and the confusion brought into experimental work by failure to recognize the spirochete of rabbits, that resembled in form the treponema pallida. Ocular lesions of syphilis were among the later manifestations that varied with the early history and treatment of such infections.

Causes of blindness

Dr. Conrad Berens, of New York, called attention to the endeavor of the National Society for the Prevention of Blindness to form a list of the causes of blindness. They used, as the basis for such a list, the recently published Report of the National Conference on the Nomenclature of Diseases. It was important that all who were interested in the matter should contribute to the compilation of such a list, which would be widely useful in the work of preventing blindness, and the diseases causing it. Reported by Edward Jackson.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Section on Ophthalmology

December 9, 1932

Dr. H. J. Rothschild, president

Ophthalmic surgery in India

Dr. W. I. Lillie (Rochester) gave a talk on this subject, illustrated by several reels of motion pictures.

In reply to a number of questions he said that in the medical schools in Bombay, Dr. Duggan; in Calcutta, Dr. Kerwood; and in Madras, Dr. Wright, worked throughout the entire year.

They each had a very well-directed medical school supported by the Government. Each chief of department was a European with the exception of Colonel Duggan. In these medical schools they had a very good opportunity to follow up their cases following cataract extraction. Col. Wright perhaps had been using more different methods than either Col. Duggan or Kerwood. Dr. Kerwood cut his capsule at the initial incision with the cataract knife, then performed an iridectomy. Dr. Duggan made a capsulotomy with forceps. Dr. Lillie said he had seen practically every type of operation that was used in the United States, and the cataracts were about the same type of cataracts as seen here. Trachoma was very common and the operations were chiefly on the lid to repair deformity which had already taken place. He had seen a few cases of intraocular tumor but, because of the peculiar philosophy of the native, one was not allowed to do an enucleation, but must eviscerate. They believed that if a part of an organ was taken away in this world they would be without that same organ in the next, so the surgeon must always leave a stump. Dr. Lillie said he did not see any muscle operation, apparently rare in India. The people believed that what was to be, was to be; if they were born with a squint they were supposed to have it.

As regards the type of operation one might choose from this experience, Dr. Lillie said he did not believe any one type could be used for all cases. Offhand he would say the Smith-Indian was very successful, especially for the hypermature cataracts. He learned to like the Elshnig forceps delivery better than any other; he thought it was easier, and the Elshnig forceps was superior to other types.

Dr. Lillie said in their cases they had six intraocular infections in which the eye had to be eviscerated, out of about twelve hundred extractions. But he felt that this incidence did not mean so much, for he believed that in the same number of white people operated on under the same conditions there would be a very much higher rate of infection. The native of India seemed to be very resistant to infection. Their infant mortality rate was about fifty-five per hundred, so by the time an individual was grown he seemed to be very resistant to any kind of infection. They had seven or eight choroidal hemorrhages, none occurring on the operating table, but developing a few hours after operation. He had not seen any detachments.

In regard to the question of fitting glasses, Dr. Lillie said that their patients did not want glasses for they did not know how to read or write; all they wanted was to be able to see to get around. There were a few patients in the upper castes who received glasses. No cylinder corrections were given.

In regard to the lighting, the City of Shikarpur did have electricity, but the supply was not dependable. Most of the operations were done with daylight or with a battery flash-light. The moving pictures were obtained by standing on the table and holding the camera about two feet above the patient's eye.

He mentioned an Indian doctor who had done about 150,000 cataract operations, using the so-called Smith-Indian operation, making a corneal incision, iridectomy, and then counter-traction for pressure. The few cases that he had seen post-operatively had incarceration of the iris in the corneal wound. They had a broad ribbon-like scar that ran through the incision. It had been said that this Indian doctor had done over 1000 extractions in one day, many of them on front porches, or outdoors. The largest number of cataract operations done in one day by any one man at Shikarpur was by Dr. Fisher of Chicago, who did 100.

W. E. Camp,
Recorder.

ROYAL SOCIETY OF MEDICINE LONDON

Section on Ophthalmology

January 13, 1933

Mr. A. C. Hudson, president

Blood-staining of the cornea

Mr. A. C. Hudson said that such cases were rare in connection with per-

forating wounds; as a rule, in this condition there had been glaucoma, without any wound or spontaneous hemorrhage. In the case presented, for ten days after an accident to his eye, the man had increased tension. At one stage the appearance resembled that of dislocated lens into the anterior chamber; there was a clear periphery with a brownish opacity in the centre. A month after the accident the condition of the cornea was at its worst. Now, thirteen months after the accident, the cornea had practically cleared.

Discussion. Mr. O. Garey Morgan spoke of a case of blood-staining of the cornea, that of a boy who had received a blow in the eye resulting in a dislocated lens with iridodialysis. There was no increase in tension and in about eighteen months the condition had cleared.

Mr. Ransom Pickard referred to a case of his, which had hemorrhage into the cornea in the course of interstitial keratitis. It was now well, and nothing had been done beside the ordinary treatment for interstitial keratitis.

Corneal transplantation

Mr. Tudor Thomas read a paper on this subject. The man upon whom this operation had been done was aged twenty-two years. He had developed interstitial keratitis in each eye four years ago. In 1930, after antiluetic treatment, both corneas were opaque, with vision of hand motion.

The graft was taken from a man aged forty-two years, of the same blood group, after enucleation of an injured eye. A 4 mm. graft the whole thickness of the cornea was removed by trephine and scissors, the margins being cut in a shelving manner. It was set aside in sterile olive oil.

After atropinization and cocainization a circular superficial cut was made in the cornea of the host over the pupil by means of a trephine of a size somewhat larger than that used to remove the graft. Two cross-stitches were inserted into the corneal substances, and then the piece of opaque cornea was removed with the same trephine and scissors.

The eye was covered with a shield and treated daily with boric lotion and a mydriatic oil. The graft had united well, and ten days afterwards was nearly transparent. The eye was injected. Two days later the man was able to count fingers at a distance of a yard, and the graft was practically transparent, with a bright reflex. Examination with a loupe showed a central gray cloud in the deep layer of the graft, and a slight encroachment on the margin by superficial blood vessels.

A fortnight after the operation the graft was well in place and flat, with scattered small gray patches in the deep stroma; the iris was free and the eye was less injected.

Three weeks after the operation the graft began to look dull and, with the loupe, minute vessels could be seen in it. These extended from the corneal stroma; vision had deteriorated. The graft became quite cloudy, but a month after the operation there was a slight tendency to improvement. Two months after the operation the man was able to count fingers at a distance of six inches, and the opacity was mostly in the central area and in the deep layers, where a few minute blood vessels were visible.

A year after the operation the graft was clearer than the surrounding area of cornea, though the latter also was less opaque than before the operation. He could count fingers up to thirty inches. His vision was now so good that he could walk in London without a stick. Mr. Thomas had walked along Oxford Street (a very busy thoroughfare) with the patient, and the latter did not collide with anybody or anything, nor did he hesitate in taking his steps; he boarded an omnibus, ran up the steps, and went straight to an empty seat.

He related that recently Miss Ida Mann asked him to operate on a baby patient of hers, aged two years. The child had been blinded by ophthalmia neonatorum, and had not seen since it was ten days old. The corneas were both staphylomatous, and the iris as a separate entity did not exist, being plastered to the back of the cornea. The

operation was done on December 3, and on January 13 the graft was almost transparent. As the eyes had been kept open, there being no ordinary blinking, he treated them with oil. The deep part of the graft was now clear, the child could see the light, and was very excited about it.

Discussion. Mr. A. C. Hudson expressed the warm congratulations of himself and the Section to Mr. Tudor Thomas for this brilliant piece of work. He considered it provided a very effective answer to anti-vivisectors, as the work could not have been done had it not been preceded by work on animals.

Mr. R. E. Bickerton reminded members that forty years ago Webster Potts, of Philadelphia, did the first cases of ocular grafting. His graft adhered, but in three days it went opaque. Later, however, the man had a vision of 3/60, after having been almost blind.

(Reported by H. Dickinson).

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

March 14, 1933

Dr. E. C. Ellett presiding

Retinal detachment

Dr. R. O. Rychener presented Anna L. W., aged nineteen years, with reattachment of the retina following ignipuncture. The right eye was injured November 15, 1931; a transverse laceration of the globe, followed by sympathetic irritation of the left eye. The right eye was enucleated on December 7, 1931, at which time vision of the left eye was reduced to 15/200 and the nerve and retina were edematous.

She came to Dr. Rychener's attention December 1, 1932, with a funnel-shaped detachment of the entire retina in three main lobes and vision reduced to moving objects. Medical treatment of absolute rest in bed, pilocarpin sweats, atropin locally, and dehydration were prescribed. Even light perception was lost.

On December 26 and 30, scleral punctures were done with liberation of the usual straw-colored subretinal fluid but there was no improvement in the detachment. On January 3, ignipuncture was done, up and out and on January 5, the disc was visible for the first time, the outlines were blurred and striate hemorrhages were visible between the disc and macula. Ignipuncture was repeated three days later, down and in, following which a retinal tear was discovered just behind the cautery hole. From that time there was gradual recession in the detachment with improvement in vision. The edema of the retina gradually disappeared and the effects of a diffuse chorioretinitis became apparent. The fundus was universally involved in a pigmentary change especially marked through the central disc and macular area. On February 2, 1933, the vision was 6/7.5 and J. 1 and the visual field was normal. Dr. Rychener thought it possible that this case belonged in the group with which were associated the detachments accompanying pregnancy and which reattached without surgical interference. However, at no time during observation before operation did such a possibility seem in the least probable.

Solitary tubercle of choroid and nervehead

Dr. R. O. Rychener presented Mr. J. D. R., aged forty-three years, who complained of disturbed vision for one week. Vision at that time, July 28, 1931, was O.D. 6/12 corrected with —.50 D.sph. to 6/7.5+. Examination revealed a crescentic slate gray area extending temporally from the disc, limited laterally by a zone of dark hemorrhage. The retinal vessels coursed over the entire lesion. The outlines of the disc were hazy but not obscured. The left eye was normal in every way.

For fourteen years the patient had suffered periodic attacks of pain in the right eye, relieved by cocainizing the right speno-palatine ganglion, and for some years he had had a chronic arthritis of the right knee.

The general examination revealed nothing except chronically infected tonsils, which were removed, and mixed treatment was instituted. The fundus

lesions became larger, and new splashes of lardaceous exudate were noted in the extreme periphery of the retina. In August, 1931, treatment with tuberculin was begun and gradually increased until 1 mg. weekly doses were reached. Mercury rubs were also used during this time.

In December, 1931, he spent some time at the Veterans Diagnostic Clinic, Cincinnati, where a diagnosis of vidian neuralgia was made. Nothing of any importance was discovered in his general examination except a positive tuberculin reaction.

Despite treatment the vision steadily failed as the lesion increased in size assuming the triangular form which was now present. New hemorrhages appeared in the retina at the borders of the lesion, underwent resolution, and finally entirely disappeared. There was present then a gray triangular mass pointing temporally from the lateral disc border, over which the retinal vessels coursed undisturbed. He was still receiving 1 mg. tuberculin weekly.

Examination March 14, 1933, disclosed a betterment in vision in the right eye, 4/60 improved with —.50 D.sph. = +.75 D.cyl. ax. 180° to 6/30. The field showed some decrease in the size of the central scotoma, but there was no change in the ophthalmoscopic appearance of the lesion.

Discussion. Dr. A. C. Lewis desired to know how the diagnosis was made, whether by skin reaction or by exclusion of all other causes. He thought it looked like a traumatic ruptured choroid which was healing.

Dr. W. L. Simpson, while at Oxford, England, heard Dr. Marple of New York report on the examinations of many children in which he stated that 100 percent of the children dying with tuberculosis, had tuberculosis of the choroid.

Dr. E. C. Ellett said that the diagnosis was arrived at by exclusion, and that this was a positive tubercle in the eye with no tubercular manifestations elsewhere. He would hesitate to produce a focal reaction because of the danger of losing the eye. He felt that the extensive choroidal scars as well as the greenish-gray pigmented lesions of the macula, which were seen quite frequently through the routine of one's office practice, were ocular manifestations of tuberculosis.

Coloboma of optic nerve

Dr. E. C. Ellett presented Edna T. R., aged seven years, whose left eye had been convergent 40 degrees since infancy. Examination disclosed that the right eye was normal in every way. The left eye showed a coloboma of the optic nerve with a large round white area about 5 d.d. in diameter around the disc. The fundus was seen with +4.00 D. lens, while the lesion receded in a funnel shape with a bluish white bottom seen with a —5.00 D. lens. The nerve was not outlined.

Retinoblastoma

Dr. James B. Stanford presented H. G. W., a three-year-old boy who had had his right eye removed April 7, 1932, for what was probably glioma of the retina. The oculist who did the operation observed the left eye monthly until the family moved from his city.

For the past two or three months the mother thought that the left eye was failing. Examination on February 21, 1933, revealed that the eye was practically blind, synchysis scintillans in the vitreous, and two retinal elevations which were assumed to be tumors. That, nasal to the disc, was decidedly larger than the one on the temporal side.

Discussion. Dr. B. J. Guyton saw this case in April, 1932. The right eye was enucleated and sent to Washington, but he could not remember whether the diagnosis was glioma or sarcoma. He watched the other eye every month but had not noticed any recurrence. Several years previously he had reported a case of glioma of both eyes with shrunken globes.

Dr. E. C. Ellett had removed both eyes for glioma in three children, ten or twelve years ago. Two of the patients were still living. While under the influence of the anesthetic he examined the other eye of one patient and found a small mass like a snowball or

fresh choroidal exudate. In a second case the history was the same. Both these cases were treated with radium. In a third case, the second eye was removed but there had been prompt extension and death. There had been published reports from London, treating these cases with radon seeds, but this was not advisable in advanced cases, or in a blind eye.

R. O. Rychener,
Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

April 21, 1932

Dr. L. F. Appleman, chairman

Wound of the eyeball by an explosion of shatter-proof wind shield

Dr. H. Maxwell Langdon presented a young man, who while driving a car enclosed with shatter-proof glass, stopped on the roadside because of the sleet which had frozen on the wind shield. To melt this he placed a candle on the ledge inside the glass, and shortly afterwards there was an explosion. A small hole about two inches in diameter appeared in the inner plate and one about one-third this size in the outer plate, while at the same time the driver felt a blow on his right eye. There was a small cut at the center of the upper lid near the margin, and the pupil was irregular in outline due to a penetrating wound of the sclera near the upper limbus. The wound was in the median line about 3 mm. long, extending upward from the corneoscleral junction, with a little bead of iris protruding. There had been a small hemorrhage into the vitreous which had rendered it somewhat cloudy but did not prevent a view of the fundus which showed no other injury. The protruding iris was excised and the wound healed promptly with perfectly normal vision.

It is not an unusual thing for some artificial heat to be applied to sleety wind shields and this of course, might be done with impunity where ordinary glass has been used. The accident which happened to this patient showed that where shatter-proof glass is used, greater care must be exercised. The material which was between the two layers of glass was a cellulose product which when heated generated a gas of great expansive force and it was this which produced the explosion. As this knowledge did not seem to be a common thing, it seemed well to put this case on record as a warning of possible danger.

Melanotic sarcoma of the choroid occurring at the optic disc in an eye with a previous detachment of the retina

Dr. H. Maxwell Langdon presented the case of a man first seen in October, 1929, with a history that the vision in the right eye had been blurred for two years. Three months previous to being seen by the writer, he had been told at the Wills Hospital that he had a detachment of the retina. The vision of the right eye was 1/60 and of the left 5/4. The right eye had clear media, a partially atrophic disc with a fundus level of minus one, and a detachment of the retina over the whole lower portion. The highest point was about +10 D., with nothing to suggest any intraocular growth. Transillumination over the detached area gave a good light from all parts. He was seen again in December, 1929, with the condition unchanged including the field, except for a slight loss on the temporal side. He was not seen again until February, 1932, with a history that he had had intense pain in the damaged eye for the preceding two days, the eye being totally blind. Examination showed that there was considerable injection of the conjunctiva of the damaged eye; the pupil was 5 mm. in diameter with no response to external stimuli. The media were too hazy to permit a view of the fundus. The vision of the left eye was 5/6 partly; pupil sluggish but responding to light and accommodation. The media were clear, disc pale, and almost completely cupped, about one diopter, the fundus otherwise being negative. The tension of the right eye was 47 mm., the left eye 36 mm. He was treated with miotics and advised to have the

right eye enucleated. Two days later this was done. The tension of the left eye was reduced to 26. The vision improved to 5/5 plus.

Pathological study showed a growth at the optic disc, the microscopic report being melanotic sarcoma. No new tissue was shown in any other portion of the globe except in this one compact mass which could not possibly have been present in the early stages of the retinal detachment without showing itself in the ophthalmoscopic examination. It was, of course, not unusual to find in a case of retinal detachment with secondary rise in tension that an intraocular growth had been the source of the whole proceeding; but in this eye there seemed to have been a simple detachment of the retina with a neoplasm developing in the eye later in the course of the condition. It was the rarity of this sequence of events which seemed to justify the recording of this case.

Syphilis in the third generation

Dr. Joseph V. Klauder said that syphilis in the third generation was very rare, but a few cases had been reported. Two children from the Wills Hospital Clinic for the treatment of ocular syphilis were presented.

Case 1. A girl, aged twelve years, the oldest of four children, when first seen had typical interstitial keratitis of both eyes. The second eye became involved one month after the first eye. Clinical examination was essentially negative excepting for overweight and infected tonsils. There were no stigmata of congenital syphilis. The Wassermann reaction was four plus, the luetin test was positive. Two younger brothers and one younger sister were negative on clinical examination and the Wassermann reaction of each was negative. Her father denied ever having had venereal disease, clinical examination was essentially negative, the Wassermann reaction, four plus. The Wassermann reaction of his wife was negative; there were no miscarriages. The father had seven brothers and sisters, none dead; one had had a hemiplegia at the age of thirty-one years. His mother died of cause unknown to him. The patient's paternal grandfather had had advanced tabes and was now dead. Examination of the brothers and sisters of the father was refused.

Case 2. A girl aged nineteen years, an only child. When first seen she had typical, active interstitial keratitis. She presented none of the stigmata of congenital syphilis. Her Wassermann reaction was four plus. She was married, had had one miscarriage and one child aged sixteen months. This child was well nourished, clinical examination essentially negative. The patient's mother (baby's grandmother) had had one miscarriage. The grandmother gave a definite history of having been infected with syphilis soon after marriage, of having had a secondary eruption, of positive Wassermann reactions and of having had antisyphilitic treatment. Her blood Wassermann now was four plus. Her husband died of cancer. The hospital where he died, informed me that the Wassermann reaction was negative.

In the first case, although the child's grandfather had had tabes, acquired syphilis in the father could not be definitely excluded, hence third generation syphilis in the child was not certain. In the second case, however, third generation syphilis was more likely since the child's mother had interstitial keratitis and the grandmother gave a definite history of infection and her Wassermann was four plus.

A. G. Fewell,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

December 19, 1932

Dr. Michael Goldenburg, president

A demonstration of ophthalmic surgery was given during the afternoon, and a large number of clinical cases were shown by the members of the Infirmary Staff, Drs. M. H. Lebensohn, Herbert Walker, Michael Goldenburg, D. C. Orcutt, E. K. Findlay, and E. R. Crossley.

Trephining with iridectomy

Dr. D. C. Orcutt said the question had been asked whether an attempt was always made to do an iridectomy after a trephining, and whether a suture was used in the conjunctival flap. To both questions the answer was yes. If the iris did not present, it was grasped, withdrawing enough to perform a small peripheral iridectomy. Trephining without iridectomy had not proven satisfactory. The flap was sutured, either with two sutures or a running stitch which was removed in two or three days.

Discussion. Dr. George F. Suker said that one should leave iris pigment, not iris tissue, in the trephine hole. If iris tissue was left it blocked the wound and thwarted the effect of the operation.

Dr. Michael Goldenburg said that no form of iridectomy opened the channel to the canal of Schlemm, and whatever value obtained from an iridectomy, was due to iris tissue or pigment being caught between the lips of the wound. Dr. Gamble had sectioned a few eyes in which an iridotasis operation was performed, and the wound was found to be lined with pigment epithelium.

Dr. Richard Gamble said an iridotasis operation afforded the best chance to have the wound lined with pigment, because the iris was drawn through the incision, leaving practically a tube lined with pigment for aqueous drainage. Following iridectomy it was chance whether iris tissue or iris pigment was left in the wound.

Dr. Harry Gradle took exception to the statement that there could be no successful result following iridectomy unless there was iris tissue or pigment in the wound. It was impossible to speak of glaucoma in generalities and it was a great misnomer to apply that term to the various types or hypertension. In speaking of success or failure it was necessary to specify the type of hypertension. We knew that in the acute inflammatory type, the best results followed iridectomy, without the inclusion of iris tissue or pigment. In the simple compensated cases, iridectomy was of no value unless there was iris tissue and pigment included in the wound to assist filtration.

Trachoma

Dr. Earl S. McRoberts said that during the evening twenty-four cases had been seen, ranging in age from eight to sixty years. The variety of complications included the usual ones found in this disease. For the past three months strong silver and copper solutions had not been used. Instead, rubs of sodium bicarbonate and boric acid powder had been used in suitable cases. The breaking down of the follicles was apparently the most necessary treatment for the lids. The results had been satisfactory and the discomfort was less than when using the strong solutions. Blepharospasm was common and was treated by canthotomy. Curettage was performed on ten cases.

Discussion. Dr. T. D. Allen said that in the literature there was reported evidence of an association of trachoma and allergy. The Infirmary offered an excellent chance to study this problem. He cited the case of an asthmatic person, sensitive to tomatoes, who had been under treatment for trachoma. When the allergy was discovered and the tomatoes excluded from the diet the eyes promptly cleared, but would become inflamed if tomatoes were eaten.

Dr. M. H. Lebensohn said that while in Palestine in 1929, he found that there the incidence of trachoma had been reduced from fifty percent to about twelve percent. This was accomplished by studying every member of a family and not treating individuals alone.

Dr. O. B. Nugent said that everything recommended for the treatment of trachoma was good, provided it was used adequately. During the past five years he had experimented with ultraviolet irradiation using no other medication. The best results followed the use of the "Cold Quartz" instrument. Some cases had cleared entirely without any remaining signs of trachoma.

Congenital dacryocystitis

Dr. Goldenburg said this baby, two weeks old, had had a discharge in the eye from the fourth day. Pressure over

the lacrimal sac had disclosed a purulent discharge from the puncta. The sac was completely expressed and the mother was told to do this twice a day, followed by instilling two percent mercurochrome. The mother had returned today and said there was no more pus. Pressure failed to produce any purulent discharge from the puncta.

Discussion. Dr. H. B. Young had seen several cases of dacryocystitis in infants, and in only one case did he use a probe. The sac was expressed, then a little fluid was instilled, and when it came out of the nose one knew that the passage was open. Further treatment was seldom necessary.

Dr. Sanford Gifford said that someone had proposed holding the canaliculus with one finger and pressing over the sac, with the idea of rupturing the membrane, which was probably what happened in this case.

Epithelioma of lower lid

Dr. Walker showed a man, seventy-eight years of age, who at the time of first admission one year ago had a history of failing vision for four years, a tumor on the right lower lid three years. This tumor had had two electric treatments just prior to admission. The lenses were cataractous. A biopsy was taken of the growth on the lower lid, and removal advised. On January 14, 1932, the tumor was removed by diathermy, and the laboratory study showed basal cell epithelioma. The patient was sent home to return for observation in one month, but failed to return until the present time and now there was a recurrence.

Optic atrophy and macular choroiditis

Dr. Francis Crage presented a thirty-six-year-old man, blind in the right eye for the past three months, the blindness having developed slowly. The disc was white with margins moderately irregular, the vessels reduced and replaced by strands of connective tissue, particularly the arteries. The fundus was not pale. There was an elliptical choroidal atrophic patch in the center of which was the macula. Some blood could be seen coursing through the venous channels but none passing through the arterial system.

Discussion. Dr. M. L. Folk remarked that the lesion appeared to have a reddish base instead of white, and seemed to have very little pigment around the border. Empty vessels were running into it. It looked like an old embolism in that region. If it were atrophic choroiditis one would see the sclera and the background would have been white instead of reddish. It looked more like a hole in the macula although it was not typical. The empty vessels also spoke against chorioretinitis.

Robert von der Heydt.

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THE FOURTEENTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS

Madrid, Spain, April 16, 1933

"Congresses," said Hirshberg, in his History of Ophthalmology "are not planned with the purpose of bringing out new things but rather for an exchange of opinions with the view to place unsettled procedures on a firmer foundation."

Today the results of research and experiment are disseminated with such rapidity that little is left that is original to be offered at quadrennial conferences. These are of great importance, however, in establishing personal contacts between those from widely separated countries, speaking different languages and living under diversified conditions. To hear the voices and to see the faces of those whom we have known only from their published writings is to give a new interest to what they may have to say. Friendships are in this way developed and sympathetic understandings established that would never otherwise have been formed.

The Ophthalmological Congress at Madrid was no exception in this regard. Owing to financial conditions many cancellations were made by those who had planned to attend; the number from the United States was only eighteen, while the total registration was between six and seven hundred. Of these, the majority were from Spain and the Spanish speaking countries; France and Italy were generously represented. The spirit of the Congress was largely Latin and the language used almost to the exclusion of every other was French.

The daily bulletins were in French with brief abstracts of important notices in German and English, and while a willing and capable group of translators and "dactylographs" was prepared to transcribe abstracts or remarks in any of the official languages, it was French that was the currency that was in general circulation and which would pass anywhere.

The Palace Hotel with its great "Sa-

lon de Conference" served admirably for the presentation of papers and addresses and adjoining it was the Exposition Hall, in which interesting and exquisite pathological preparations were on view. One of the most effective of these was that of Columbia University sent by Professor John M. Wheeler. This university was represented by Drs. Castroviejo, Redway and Troncoso.

The planning of such a Congress takes much time in order that it may work smoothly and great credit must be given to the President, Professor Marquez, and his unwearying associates, the general secretaries, Drs. Poyales and LaCarrere, to Dr. Castresana, the vice-president of the National Committee of Organization, and other members who seemed to be everywhere present and ready to aid the foreign visitors whenever suggestions or advice could be of help.

The method employed at Amsterdam of assigning a number to each member when his subscription was received was found most practicable at Madrid and each on registering was given a package containing not only notices, assignments, invitations, etc.—and the hosts were lavish in their entertainments—but as well, two volumes containing the full papers on the stated subjects, "Detachment of the retina," "Tuberculosis of the iris and ciliary body," and a third volume with abstracts of all the volunteer papers that had been received in time to be included.

An exceedingly acceptable addition was a volume containing the photographs of the congressionalists. This will long be treasured as a delightful souvenir of the occasion.

Every detail of the Congress was planned with care. The emblem which was used had a historical significance. The diopter as the unit of refractive power at a distance of one meter was accepted in 1875 by the Ophthalmological Congress at Brussels. It had a precursor, however, for Deco de Valdez in 1623 published a book entitled "Use of glasses for all kinds of sight." He describes "parts of spheres which diminish from a sphere of two yards diameter, that is, one yard radius (a Spanish yard being a little less than a meter) to another having the same diameter as the roundness of the eye." The figure taken from his book showing the curvatures from approximately 1.25 diopters to 36 diopters made a most attractive and interesting emblem, which was used for the badges, imprints, etc.

The Congress was inaugurated with no little dignity and ceremony in the Great Hall of the University. Seated in the center of the stage was His Excellency, the President of the Spanish Republic Alcalá Zamora and on either side the Minister of Public Instruction, the Minister of Marine, the Director of Hygiene, the Rector of the University, the Dean of the Faculty of Medicine, and Professors Vander Hoeve and Marquez.

Professor Vander Hoeve, the President of the International Council, after respectfully saluting the head of the Spanish nation and other dignitaries, recalled with emotion those who had passed on since the meeting in Holland four years before. Among these was the late President of the Council whose place the orator ocupied, Dr. Lunsgaard; and Teacher Collins, who had labored so constantly for international rapprochement, as well as the revered Fuchs, Axenfeld, Roselli and others. At the request of the speaker all stood for a moment in silence in memory of those who had gone before.

"But", he continued, "life goes on and we must look before us." In the name of the Council he extended greeting and welcome to those present, successively in French, English, German, Italian and Spanish. Felicitous responses were made by representatives of various countries who were seated upon the stage. Among those were Professor Terrien, Sir John Parsons, Walter Parker, Ovio, Kruckmann, Van Duyse, Demaria, Nordenson, Oguchi, Sousa, Szymanski and Von Grosz.

The Minister of Instruction, Fernando de los Rios, then declared the fourteenth Ophthalmological Congress opened.

A memorable feature of the opening session was the receipt of a letter from the venerable histologist to whom we owe our basic knowledge of the anato-

my of the retina, Professor Ramón y Cajal, who, because of his weight of years and lack of strength, was unable to be present in person. He promised, however, to embody some of his later observations in a publication which he would send giving a histo-physiologic analysis of some points yet undetermined on the architecture of the retina.

As a souvenir of the Congress a beautiful bronze medal with the head of Cajal designed by the great sculptor Benlluire and a sketch of the structure of the retina was presented to each congressionalist by the President, Professor Marquez.

The President of the Congress was most happy in his remarks. He recalled that two countries, small in extent though they were, were celebrated for the great names connected with our specialty, Holland and Belgium. It was in the latter that the first ophthalmologic review, "The Annales d'Oculistique" was published in 1838 by Onnier, and it was Warlomont who in 1857 inaugurated the first of the series of Congresses of which this was the fourteenth.

Holland was the fatherland of Donders, of Snellen, of Grotius, of Huygens and Erasmus. To France was accorded the honor of having given birth to Brisseau who located cataract in the crystalline and Daviel who made the first extraction. From Germany came Helmholtz and Graefe and from Italy the professional descendants and followers of Scarpa and Morgagni and in 1923 the illustrious Albertotti came to Spain to be present at the centenary of Deco de Valdez. He spoke with enthusiastic appreciation of the vast host of skillful and able ophthalmologists that were coming from Great Britain and Ireland and the Americas.

Don Alcalá Zamora is said to be the most eloquent speaker in the Iberian peninsula. Of rather less than medium height, with most expressive features and penetrating black eyes, it may easily be seen how readily he would carry an audience with him. He showed an unusual knowledge and sympathetic understanding of the work which the Congress had convened to do "While other nations are engaged in fratricidal quarrels urged on by an exaggerated sense of Nationalism, Spain following its ancient tradition, looks upon all men as brothers. You are come to visit a nation that has been passing through a period of blindness but the bandage has been removed from its eyes and today it is firmly fixed on a vital sense of human solidarity." In the name of the people he extended his greeting.

At the Congress held in Holland four years ago the number of volunteer papers that was offered was an embarassment of riches. About three hundred authors had sent in communications. These were of course, of varying value but in order that all might be read, or at least abstracted, three conferences were held coincidentally. It was impossible, therefore, when two important subjects were to be presented at the same time that both could be heard by any member of the Congress. To avoid such a conflict of hours, the volunteer papers at Madrid were limited to about fifty and it was arranged that all should have an opportunity of presentation. To accomplish this it was necessary to begin at eight-thirty in the morning.

Among the important communications read at that time was one on "Gonioscopy, methods and results in glaucoma," by Dr. Troncoso, who also gave several demonstrations of the use of his instrument at the University.

For the first time in the history of Congresses, preventive measures were given a prominent place on the program and the ten o'clock hour was assigned to the International Association for the Prevention of Blindness. In the absence of the president, Professor deLapersonne, Dr. Park Lewis presided and Dr. Marin Amat acted as Secretary. The meeting was one of unusual interest; reports were received from the several national committees by their representatives. Speaking for France was Dr. Coutela, for the United States, Dr. Park Lewis, for Belgium, Dr. Van Duyse, for Austria, Dr. A. Fuchs, for Egypt, Dr. El Maziny Bey, for Holland, Dr. Vander Hoeve, for Brazil, Dr. Alvaro, for Bulgaria, Dr. Pascheff, for Spain, Dr. Marquez, for Hungary, Dr. von Grosz, for

Poland, Dr. Zacher, for Portugal, Dr. Moutinho, for Switzerland, Dr. Kenel and for Germany, Dr. Wagenmann.

Professor Marquez read a communication on the necessity of a classification of the causes of blindness. This was supplemented by a paper on the same subject by Dr. Marx of Holland.

After an extended discussion a Commission was chosen to consider the subject more particularly from a professional standpoint and to report at a subsequent Congress. The committee named was Doctors deLapersonne, Park Lewis, Bishop Harmon, Maziny Bey, Marx and Marquez. Equally important and interesting was the session at which Prof. von Grosz was Chairman, given to the League for the Control of Trachoma.

All of the second day, Tuesday was devoted to the first two main subjects chosen for consideration, "Tubercular uveitis" and "Retinal detachment". The papers on these subjects had been published in precessional volumes and were already in the hands of the members. The first included a study by E. V. L. Brown on the "Modern treatment of tubercular iridocyclitis," by Igerheimer, one on its pathology and one on its differential diagnosis. Like the paper on retinal detachment these careful reviews of work done by masters in ophthalmology mark an era in this age of progress.

The Congress was terminated happily by an excursion to the ancient and historic City of Toledo. The Spanish people were most generous hosts and the fourteenth will be remembered as one of the most successful of the Ophthalmological congresses. The next Concilium will be held in Cairo four years hence under the presidency of Dr. Sobby Bey-B. Park Lewis.

THE CINCH OPERATION FOR STRABISMUS

This operation was planned by Dr. Roderic P. O'Connor, after serving with a cavalry regiment in the Medical Corps of the U. S. Army, in Arizona. It was suggested by the method of shortening a saddle girth, commonly used in that region. The girth is composed of several strands, and is shortened by looping a rope across each strand. Then by pulling on the rope each strand is looped around it. He first did the operation on a blind, divergent eye, of a Mexican, who desired the improvement of his physical appearance.

This case was reported in the Journal of the American Medical Association, March 2, 1912. A description of the operation, with reports of twelve cases, was published in the Ophthalmic Record in 1912, vol. 23, p. 595, and one in the Archives of Ophthalmology, vol. 43, p. 368. Another description of the operation and its variations, with report of 42 cases appeared in the Transactions of the Section on Ophthalmology of the A.M.A., in 1916, p. 236. It has been noticed in the Ophthalmic Year Books for 1912 and 1914, with explanatory illustrations, and in subsequent volumes. It is well described and illustrated in de Schweinitz Diseases of the Eye, tenth edition, p. 790, but apparently it has not been noticed in the European literature. The operative treatment of squint and heterophoria has never received the attention in Europe that it has in the United States.

The principle of the cinch shortening of a tendon, differs from those involved in other muscle operations, like advancement, tendon tucking, resection, or the many elaborate sutures that have been described from time to time. In the System of Ophthalmic Operations, edited by Casey A. Wood, in 1911, there are 28 figures to illustrate the placing of sutures for operations on "extrinsic muscles." There is of course, no mention of the cinch operation, because the book was published before Dr. O'Connor had described it. He had noticed the great variety of stitches and ligatures, that were being tried to shorten the extraocular muscles, and, from their number and complexity reasoned that not one of them could be wholly reliable and satisfactory. He thought the cinch looping was worth trying, and he found it superior to the operations that had preceded it. This is now the general verdict of all surgeons who have given it an intelligent and extended trial.

The essential principle on which this operation is based cannot be easily understood from a verbal description. Even from the good illustrations that O'Connor has given of it, the full understanding is not easy. With a piece of non elastic webbing or tape, such as is used in belts, one can make an imitation of the tendon of insertion of a rectus muscle, and with a soft flexible rope, one-fourth, or one-half inch in diameter, to represent the catgut suture used in the operation, we have a model that will render clear the essential principle of the cinch operation. The webbing is cut into four lengths; which placed side by side will represent the tendon, split into four strands. The rope is looped around each of these, as represented in the illustrations of the operation. Then by pulling on the ends of the rope, it straightens out, and the looping of the strands takes place. This can be repeated with such a model, until the principle of the looping becomes perfectly clear; and some possible dangers of failure to get just the right shortening, can be understood and guarded against. But to get a full mastery of the operation, it is better to see it done by O'Connor, or one of the surgeons who has learned it from him.

The cinch operation has been used and recommended, by several operators broadly acquainted with general operative surgery. In their hands it has justified the claims made for it by its proposer. There is no loss of effect by slipping of the tendon, or cutting out of sutures dragging in the direction of the tendon fibres, or sloughing of constricted tissues, and no large bunch left under the conjunctiva, as by some of the tucking operations. As O'Connor pointed out, the tendon does not stretch. It is the extensibility of the muscle tissue, that leads to miscalculation of the effect aimed at. When the catgut has disappeared from the loops of tendon, the new formed tissue around them seems very accurately to hold the shortening to what was originally planned. It seems to attain the ideal result for new-formed tissue, preserving the relation of parts, for which the exudate is thrown out.

The cinch operation deserves more permanent attention than is accorded to operations on account of their novelty. A longer acquaintance with it has removed from the mind the reasons for doubt, with which many new operations may be wisely regarded.

Edward Jackson.

THE FOURTH ANNUAL MEETING OF THE ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY

The fourth meeting of this organization was held in Milwaukee on June 13, 1933. The subject of cataract was discussed, especial stress being laid on original research concerning the metabolism of the lens. This was the first meeting in which the material for the papers was derived almost exclusively from laboratory experiments. The third annual meeting gave an indication of what was to be expected while this fourth meeting approached very nearly the intention of the organizers of this Association.

The attendance was good, being a few over a hundred. The contributions were the results of a great deal of study. Obviously much of this had been going on in laboratories of the contributors for many years and naturally much of it had been previously published. The papers summarized the work accomplished thus far in the particular subject discussed and each author added his recent findings.

This Association does give an opportunity to the laboratory worker to present his researches to a sympathetic body that may criticize them constructively. Quite obviously these rather long and sometimes abstruse presentations are frequently difficult for the listener to understand, because they depart from the subjects with which he has to deal in his daily routine; unless he has by chance been especially interested in work along a similar line. For most ophthalmologists a short summary could be made to contain all of the outstanding facts with the elimination of the details. These details however are

important factors for a critical estimation of the work. It would seem as if the most important reason for presenting these full descriptions of the problems was in order that they might be adequately discussed and yet such discussion has been, in a large measure lacking, probably through failure of the commissioners to be advised of the contents of the papers sufficiently early to have digested them and thought over the points which they might consider needed clarifying, amplification or criticism. If an open and informal discussion cannot be elicited there seems little to be gained in listening to these papers, over the reading of them when there is ample leisure, because a considerable amount of time is necessary to most persons for their thorough comprehension.

Perhaps it is desirable that this Association shall have for members chiefly those who have a keen interest in, and broad understanding of, certain fundamental sciences such as chemistry, physiology and physics. This would mean a relatively small group. To interest the larger group of ophthalmologists engaged in clinical practice some less exacting method of presentation would have to be devised. Just how this is to be accomplished, if it is thought desirable, is hard to decide. Perhaps shorter papers more in the nature of summaries of the work, the full presentations having been sent to certain of the commissioners known to be interested in the subject, who would be prepared to ask questions which would bring out those features which the commissioners desired to stress might be a better way. This would make the discussions a more important part of the presentation. Another device would be to intersperse the more abstruse subjects with a few that are of obviously practical importance.

It might seem reasonable that the association member should attend only those parts of the program in which he is especially interested, because it is somewhat exhausting to listen to involved scientific discussions for an entire day; but if the ophthalmologist has taken the time away from his practice for an extra day he naturally wishes to gain as much as possible during this day and does not like to miss any of the presentations.

The project is still in the experimental stage. It will require several years to determine the place of such an organization as this in ophthalmology. Much time and labor has been given by an enthusiastic group to develop this body into something of real value and it is fitting that ophthalmologists lend their support during this period of construction. They can undoubtedly be of great help by giving their ideas to the committee working on the development of this association.

Lawrence T. Post.

BOOK NOTICES

Le biastigmatisme dans la pratique (Biastigmatism in practice): tables for transforming bicylindric lenses of oblique axes into spherocylindric lenses. By Doctors M. Marquez and T. Busto. Paper covers, 55 pages; second, enlarged edition. Madrid, published by the author, 1933.

The subject of this essay was first elaborated by the author in a communication to the International Medical Congress in London, in 1913. His method was discussed editorially in the American Journal of Ophthalmology in October, 1930, and February, 1931. Essentially, Marquez believes that corneal and lenticular astigmatism should be determined separately, and in many cases that they should be represented separately in the same prescription. He insist strongly on preliminary measurement of the corneal astigmatism with the ophthalmometer, and the measurement of lenticular astigmatism is represented by the difference between the corneal and the total or net astigmatism, including of course any difference of axis. The mathematical relationships involved are complicated; and they are calculated for practical application in the tables which accompany this monograph. The objection to the author's contentions, as was clearly pointed out by Stock at the London

Congress of 1913, is that any bicylindric combination at any pair of axes may be correctly represented by a single cylindrical strength at the appropriate axis.

W. H. Crisp.

Bulletins et Mémoires de la Société Française d'Ophtalmologie, 1932. Paper bound, octavo, 477 pages, with numerous illustrations in black and white. Masson et Cie, 120 Blvd. Saint-Germain, Paris. Price not stated.

A considerable portion of this volume is devoted to a description of the festivities and exercises commemorating the fiftieth anniversary of the founding of the French Ophthalmological Society which took place at Paris from July 18 to 21. The opening assembly was held in the great amphitheater of the Faculty of Medicine under the presidency of Professor Félix Terrien. A history of the Society was read by the secretary, René Onfray, following which there were addresses by delegates from the International Council and by representatives of ophthalmological societies throughout the world. Doctor Walter R. Parker of Detroit presented the compliments and best wishes of the ophthalmological organizations of the United States. Other discourses were delivered by delegates from the Academy of Medicine and from various French societies. A reception was held in the salons of the City Hall of Paris where addresses were delivered by Lionel Nastorg, vice-president of the Municipal Council of Paris, and by Professor Henri Coppez, dean of the Committee of the French Ophthalmological Society. In the evening a banquet was given by the French Society and the Ophthalmological Society of Paris in honor of the representatives of the foreign societies. Addresses were delivered by Doctor Bailliart and by Professor Siegrist of Berne. The festivities concluded with a boat excursion down the Seine to Saint-Cloud and with an evening at the Opéra where "L'illustre Fregona" by Laparra was heard.

The remainder of the volume constitutes the 1932 report of the Society the annual meeting of which was held simultaneously with the anniversary celebrations. In it are included the by-laws of the Society, the list of members, short obituaries of the six members who had died during the year, and the fifty-one reports complete with discussions which were presented before the Society. Among these are "The operation of choice in trachomatous entropion of the upper lid," by Junès; "Biomicroscopy of the conjunctiva with vital staining," by Cuénod and Nataf; "Accidents and complications in total extraction of cataract," by Barraquer; "A new clinical sign for the differential diagnosis and prognosis of the retrobulbar neuritides," by Weekers; and "Variability of the forms of herpes of the cornea," by Fage. A summary of each report will appear in the abstract department of the Journal.

The report of E. Redslob entitled "The vitreous body" was submitted to the Society on July 19 and is published as a separate volume which will be reviewed separately. The report for 1933 is entitled "The follicular conjunctivitides" and is to be presented by V. Morax; the report for 1934 is entitled "Biomicroscopy of the conjunctiva" and has been entrusted to A. Cuénod and R. Nataf of Tunis.

Phillips Thygeson.

Studies in the history of ophthalmology in England prior to the year 1800. By R. Ruston James. 246 pages. Cambridge University Press, 1933. Price $4.00.

This is an interesting account of the early ophthalmologists in England. It has been compiled from the best known authorities on the subject and written in a very readable manner.

The first third of the book is devoted to the ophthalmology of the early centuries about which there is much obscurity. In the seventeenth century individuals who produced ophthalmic literature began to stand out. Among the important figures of this century were Bannister, Turberville and Briggs.

The chapter on the eighteenth century has a sub-heading "Orthodoxy"

and the first sentence states that "Altho the eighteenth century was the heyday of ophthalmic quackery, it saw the foundations laid of the modern ophthalmology at the hands of those orthodox surgeons who practised in diseases of the eye in addition to general surgery."

The longest chapter is devoted to "The Chevalier Taylor" who is described as "pre-eminent for unblushing effrontery, blatant self laudation, and all the methods of the charlatan, but also for mental endowments far above the average of his tribe, and for a real acquaintance with the contempory state of ophthalmic knowledge. His fame extended to every country in Europe; his boast of having conversed with kings and princes is no idle one; he had an acquaintance, not always felicitous, with some of the best-known men, medical and lay, of his time; counting translations and minor works he was the author of nearly fifty books; . . . ."

A considerable amount of knowledge and a large amount of pleasure is available to the ophthalmologist who will at his leisure peruse this entertaining volume.

Lawrence T. Post.

Senile cataract. By W. A. Fisher, M.D., F.A.C.S. Second edition, 183 illustrations, 267 pages. Published by the Chicago Eye, Ear, Nose and Throat College, Chicago, Ill., 1933.

This second edition follows ten years after the first and is an enlargement with several important changes. The chapter by Fuchs has been reproduced without changes and that of Barraquer with very little change. Dr. Holland's contribution has been rewritten with many additions. The chapter by Dr. Wright has been rewritten though his method of operating has been unchanged. The chapters by Lieut. Col. Henry Smith have been omitted. The author's own chapters have been rewritten and considerably amplified.

The book gives a very good summary of the different types of intracapsular extraction and is a valuable book for the ophthalmic surgeon.

Lawrence T. Post.

OBITUARIES

George Slocum
1865-1933

Dr. George Slocum died suddenly at his home in Ann Arbor, Michigan, on March 24, 1933. He was born July 18, 1865, in Ledyard County, New York. He attended Sherwood Select School and Oakwood Seminary, at Union Springs, New York. Later he entered the Medical School of the University of Michigan and was graduated in the class of 1889. After one year of postgraduate work at the University, he went to Genoa, New York, where he engaged in general practice until 1902, when he returned to the University of Michigan for special postgraduate training in ophthalmology and oto-laryngology, under the late Dr. Carrow. He practiced as a specialist in South Bend, Indiana, for one year. In 1904 he began his connection with the Medical School of the University of Michigan as Demonstrator in Ophthalmology, occupying this post for eight years, after which he became an instructor. In 1908 he pursued extensive postgraduate work in Vienna, returning to Michigan where he was made Assistant Professor in Ophthalmology, and in 1929 Associate Professor. In 1932 he was made Professor of Ophthalmology, in charge of the department. Coincidental with his University career, Dr. Slocum practiced privately in Ann Arbor for more than twenty-five years.

He was a member of the American Medical Association, American Association for the Advancement of Science, Michigan State Medical Society, Washtenaw County Medical Society, American Academy of Ophthalmology and Oto-laryngology, Rotary Club and other organizations.

He made several contributions to ophthalmic literature, the most noteworthy being his studies of the "Ocular manifestations of cardiovascular diseases". He left a paper on the use of "Conjunctival suture in cataract extraction" which had not been published.

He is survived by his wife, Helen D., and stepmother, both of Ann Arbor; a brother, Frederick, of Pasadena, Cali-

fornia; and three sons, Giles H., of Syracuse, New York; Frederick V., of Detroit, Michigan, and Vaughan V., of Paris, France.

It was my privilege to be associated with Dr. Slocum at the University of Michigan for a period of twenty-seven years. Always a serious student, his progress was continuous and due to his Quaker conscientiousness his work was ever meticulously performed. He loved to teach and nothing was ever too much trouble so long as the student was in earnest. Indifference or lack of interest he could never tolerate. He was a wise clinician with the best interests of the patient constantly before him. He played an important part in the development of the Department of Ophthalmology in the University.

Naturally somewhat reticent, it was only after many contacts had been made that he showed his real worth. But to know him was to admire and appreciate him. All who were privileged to gain his friendship, have sustained a great personal loss, and the University has lost a fine teacher, clinician and administrator.

Walter R. Parker.

Joseph Stanley Lichtenberg
1869-1933

Dr. Lichtenberg died April 2, of gas bacillus septicemia, following an operation. He was one of those physicians whose importance to the profession, and to his community, could be estimated only through personal contact of professional colleagues and patients. The few papers he contributed to the literature of ophthalmology were of excellent quality and permanent value. They attracted no attention by novelty, or exaggerated claims of importance, but were safe guides to the thinking and practice of those who read them.

His father was a manufacturing optician, and his interest in visual optics was awakened when he was grinding lenses in his father's shop. The elder Lichtenberg also had a standard barometer, the readings of which were each day telegraphed from Kansas City to other parts of the country, before the United States Weather Bureau had been established. Dr. Lichtenberg's medical degree was taken at University Medical College at Kansas City, in 1896. After graduation he spent one year at the Hermann Knapp Memorial Eye Hospital in New York City, and after that studied abroad at Prague and Vienna.

Returning to Kansas City he entered actively into ophthalmic practice, and joined the general local medical societies, and the American Medical Association. He joined the American Academy of Ophthalmology and Oto-laryngology in 1906, and from that time was an active contributor to its Transactions, making many brief but valuable contributions in his discussions.

When the American Board for Ophthalmic Examinations was established, he was one of the first to take its examinations and receive the certificate. He also became a Fellow of the American College of Surgeons. He was a wide reader and had a practical command of the French, German, Italian and Spanish languages. In the words of a colleague: "Industry, remarkable ability, unyielding integrity, an inexhaustible supply of kindness, were among his admirable qualities. Knowledge, and willingness to impart this knowledge, made him the ideal teacher."

Edward Jackson.

CORRESPONDENCE

Celebration in honor of Professor Anton Elschnig*
on the occasion of his seventieth birthday

Professor Anton Elschnig was born on August 22, 1863, in Leibnitz, Austria. He began his medical education in Graz and graduated there in 1886. His ophthalmologic career started with Prof. Schnabel in Vienna. He was appointed Assistant Professor of Ophthalmology in Graz in 1892 and transferred to Vienna in 1895. In 1900, he was made Professor of Ophthalmology in Vienna and in April, 1907, Chief of the German University Eye Clinic in Prague, Czechoslovakia.

He has published more than 250 sci-

* From the French by Dr. Richard Lischka.

entific papers in addition to the following monographs and books:

The entrance of the human optic nerve. Academy of Sciences, 1900.

The normal anatomy of the entrance of the optic nerve. In the tables of Magnus, collection XIX, 1900.

Functional testing of the eye for students and physicians. Vienna, Deuticke, 1896, 2, ed., 1911, 3, ed., 1923.

Stereoscopic photographic atlas of the pathologic anatomy of the eye. Vienna, Braumüller, 1902, 64 photographic tables with text.

Photographic medical Atlas. von Neisser, 1911.

Seven papers on sympathetic ophthalmia in Graefes Arch. f. Ophth.

A collection of works on glaucoma and papilloedema.

The pathologic anatomy of glaucoma. In the histo-pathologic anatomy by Henke-Lubarsch, 1928.

The chapters on diseases of the cornea and sclera, and the differential diagnosis of fundus diseases. In the text book of ophthalmology by Axenfeld.

As one of the editors of the Graefe-Saemisch Handbook in 1908, he rewrote the great Czermak treatise on ophthalmic surgery.

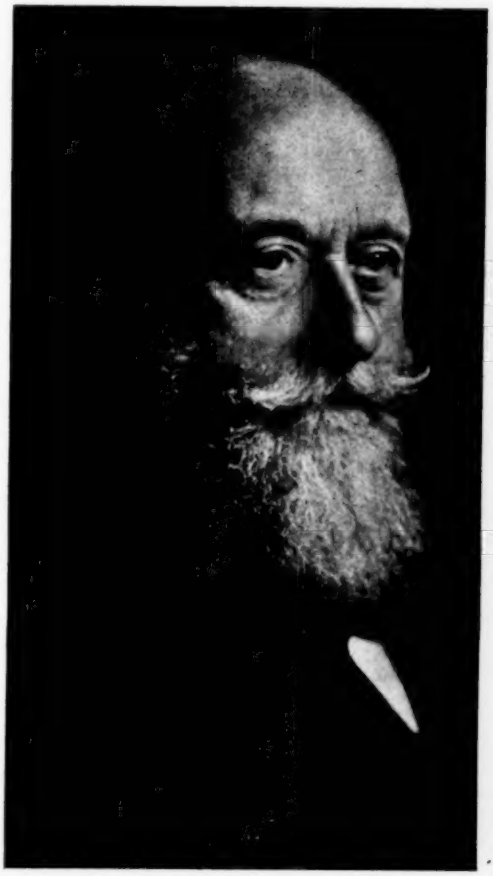
A hand book on ophthalmic diseases for eye nurses. 1915.

A number of works on original operations and modifications of ptosis and glaucoma operations (cyclodialysis, iridectomy).

Modernization of the von Hippel keratoplasty, based on an experience of more than 180 cases.

The official retirement of Professor Elschnig into private life marks the scholastic passing of one of the really great ophthalmologists of modern times. Known throughout the world for his great ophthalmic versatility, he is probably best known as the operator par excellence of the ophthalmic surgical world. His cataract extractions number more than 10,000 and his clinic has long been the Mecca of ophthalmic surgeons wishing to learn the refinements of the profession. Hundreds of ophthalmologists from all over the world have visited the Clinic annually to study and admire his operative dexterity.

But on a par with his personal ability was that unusual faculty of developing a brilliant and energetic school of younger men. For the past thirty-five years Professor Elschnig has developed assistants whose names are familiar to the entire ophthalmic world by reason



ANTON ELSCHNIG

of the brilliance of their achievements. Under his direction his assistants have published over 370 papers, emanating from the Clinic.

By the official retirement of Professor Elschnig, the medical faculty of Prague loses one of the greatest ophthalmologists that has ever graced that ancient and outstanding body. The University will feel the loss of this man who has ever been an active and devoted member of the Faculty. The assistants will miss the ever-present stimulation of their much beloved Chief.

Professor Elschnig numbers among his American pupils the following:

Gradle, Gifford, Meyer, Vorisek, Shapira, all of Chicago; Samuels, Waldstein, King, of New York; O'Brien, Iowa City; Sneed of Columbia, Missouri, and Begle of Detroit.

As the last American who has had the honor and pleasure of working under Professor Elschnig, may I, in the name of his American pupils, take this opportunity to say that we all regret his official retirement. It has been our good fortune to learn from such a capable teacher.

We congratulate him on his seventieth birthday and wish him continued long life and happiness.

Theodore M. Shapira.

Prague, May, 1933.

Impressions of the Madrid Congress

By a stroke of good luck, Spain was the country and April the time chosen to hold the XIV International Congress of Ophthalmology. While the combination of a hospitable people and the bracing spring of the Castilian Plateau was not an unknown quantity, it had not been foreseen that Spain was also to be a republic by 1933, and April the 14th its anniversary. The Congress took place, therefore, at a festive time in democratic Spain, and gained greatly from this combination of circumstances.

The New Spain, which, as its unique constitution says, has renounced war as an instrument of national policy, has concentrated its attention on making cultural conquests, and in keeping with that policy had appropriated 100,000 pesetas to guarantee any deficit in the Congress budget. His Excellency, the President, Señor Don Niceto Alcalá Zamora, at the inauguration called our attention to the New Spain, and, resorting to ophthalmic terms, said: "You are visiting a people who have passed through a period of blindness. Now the scales have fallen from their eyes. Like the blind man on recovering his eyesight, they have thereby gained a stronger sentiment of human solidarity." Prof. Marquez, the President of the Congress, said that he had counted on a large attendance at this "Congress of Optimism," but was hardly prepared for the more than 1000 members and guests. Forty countries were represented, fourteen persons came from India, some from Japan, and one from Palestine. The few Russians who had registered failed to come. A large proportion of the Germans did not come. There were few Englishmen. The American delegation, with Dr. Walter Parker at its head, was small. One Madrid paper announced on the eve of the Congress that no Americans were coming, and that some had even written for a return of their membership fees, because of the crisis. Since there were already Americans present at Madrid when this was written, the reporter was probably misinformed about the second item, but it reflects the exaggerated notion of the gravity of the American depression existing in some parts of Europe. This was even more apparent later when the exchange of the American dollar was suspended on April 21 for a brief period, a situation which frightened the European members possessing American dollars more than it did the Americans. It should however be noted that too few Americans had registered, and one missed the names of those who could easily have afforded the registration fee, let alone the trip. From my own knowledge I can testify to rumors current in the United States during the past year to the effect that the Congress would not be held because of unrest in Spain, due probably to anti-republican propaganda of which we had evidence even in Spain. The time of the year was perhaps also a deterrent for Americans.

These circumstances and the events in Germany gave the Latins a dominant position at the Congress. The Spaniards led in membership and communications, and they and the Latin Americans, Italians and French contributed more than two-thirds of the membership and the papers. The American delegation, with only eighteen members present, contributed the goodly number of nine papers and shared fully in the honors of presiding at the Congress sessions, in invitations to official luncheons and in publicity in the local press given to the foreign members. A nice gesture of Dr. Park Lewis, the President of the International Association for the Prevention

of Blindness, was to include us all as official delegates to the Association.

The internationalism of science, questioned east of the Rhine, maintained itself, thanks to the diplomatic skill of the internationally minded Prof. Marquez. While the lurid headlines of the Madrid papers informed us of what they termed the "Inquisition in Germany," German Jewish Ophthalmologists were on friendly terms, outwardly at least, with some of their German Aryan colleagues. Representation on the Council, it was reported, was fought for and secured by the East Indian and the Latin American delegations.

There was of course no ground for the misgivings of those who stayed away from the Congress. We were dined, wined and fêted as only perhaps the Spaniards know how to do, and the one effect of the republicanism of Spain was to give a democratic keynote to the Congress itself as well as to all the official functions. The most informal spirit reigned at the reception given us by the President at the Palacio Nacional, famous for its admirable Goyas, and both the President and the Prime Minister Azaña circulated without ceremony and conversed with the rank and file of the membership. The President, by the way, has so far declined to take up his residence in this palace of the former kings, and uses it only for State functions and business. There were also a reception by the Mayor of Madrid, an excursion to the Escorial (where Gonin gave the keynote of good fellowship by a whimsical speech in a dozen languages to all and sundry ophthalmologists of the world), a trip to Toledo, privately conducted groups to the Prado, a special performance of the Madrid Symphony Orchestra, under Maestro Arbós, with the second and third parts of the program devoted to Spanish composers, luncheons to large groups of members by Marquez, Poyales, and Lacarrére, and an official banquet attended by six hundred people. At the banquet the polylingual Van der Hoeve, Feigenbaum and Leslie Paton spoke in Spanish, Marquez spoke in French, and his Excellency, the Socialist Minister of Education, Señor Don Fernando de los Rios, who also spoke in French, reminded us that we were social beings as well as ophthalmologists, and stressed the humanism of science. All the speakers paid tribute to the contribution by Spain to modern ophthalmology, notably by the work of the grand old man of Spain, Santiago Ramón y Cajal. There were also many operative clinics and demonstrations held at the Madrid hospitals. An extraordinary "corrida" was offered in honor of the "congresistas." It was evident that the people are as fond of the sport as ever, and the President is said to be a great fan. It was the consensus of the local press that the toreros were better than the bulls, who refused to put up a fight. Only those who were neither squeamish nor bored by the tame performance got a thrill at the end when a torero in spite of a lacerated thigh finished a brave bull in the sixth round. Some of the jocose reporters saw the ophthalmologists "blind" to the finer points of the sport by misplacing their applause and their silences. The second bull was offered, as is customary, to one of the members, Dr. Lijo Pavia of Buenos Aires, with the traditional formula: "I offer you the death of this bull, and I hope it pleases you."

A great deal of publicity, columns of it, was given in the Madrid press to the Congress, its proceedings, its important figures, national and foreign. One noted in the press many other medical meetings going on at the same time: a Eugenics Congress, a meeting of the Spanish Society of Hygiene, a Spanish Medical Students' Congress, all attended by foreign visitors, French, English and German. There was also evident a lively tourist traffic from all parts of a politically and economically distracted Europe. Madrid, always an active book mart, with abundant book stores, had its Book Week at the same time, with a well patronized book fair on one of its thoroughfares. If one asks a Spaniard to name the outstanding achievement of the new regime, one invariably gets the answer, "Education!" There are many new, modern school buildings in evidence, and they are served by well paid teachers.

The proceedings of the Congress, I understand, are to be published in the course of the present year. Of the 150

papers and demonstrations, a third were devoted to "Detachment of the retina." Some of the papers do not appear in the volume of abstracts because they arrived too late. Others were not read because the authors did not come. Detachment of the retina was exhaustively covered, and the value of concentrating the attention of a Congress on a small number of themes amply demonstrated. The outstanding feature was Arruga's scholarly and complete survey of the clinical and experimental work, by himself and others, much of it hitherto unpublished, and gathered intensively since the Amsterdam Congress. The net result of the barrage of detachment papers seems to the writer to fortify Gonin's thesis, although, as Vogt pointed out, Gonin is to be credited with the campaign for its application rather than with its priority. Gonin, in the discussion stressed "retraction" rather than "attraction" as expressive of his views. The evident popularity of the Weve diathermy procedure and its modifications has served to make the Gonin-Sourdille controversy somewhat academic, and Jeandelize offered a mixed pathogenetic theory of detachment—exudation plus a secondary hole. Pascheff pointed out that nature cures detachments in two ways, either by resorption or by cicatrization. It was clear from a number of contributions that both detachments without holes, and holes without detachments occur, and that spontaneous cures by rapid pigment proliferation at the tear occasionally take place. Among the new contributions to the therapy of detachment are the use of freezing, to produce an adhesive chorioretinitis by Giambattista; the use of a pyrometric electrode to control the temperature by Coppez; the employment of deep intratenonian hypertonic salt solution in combination with cauterization by Marquez; and excision of sclera combined with diathermy, and productive of a reduction in the myopia, by Hildesheimer. There was a general emphasis on individualization in the use of the various procedures, in accordance with surgical indication, and Sabbadini pointed out that luetic and arteriosclerotic cases were more amenable to treatment than the tubercular cases which are prone to band formations and relapses after any treatment. The workmen's compensation aspect of the newer developments in the therapy of detachment were dealt with by Arruga, Jeandelize and Baudot, and the writer, with an essentially similar advocacy of greater recognition of the role of minor and indirect trauma.

The second official theme of the Congress, "Tuberculosis of the iris and ciliary body" received a more passive response from the Congress as a whole, aside from the elaborate official reports by Brown, Igersheimer and Lagrange. As far as the writer could follow the subject, it would seem that the histologic findings are not sufficiently specific, that tuberculin reaction alone is hardly valid, that differential diagnosis is mainly a diagnosis by exclusion, and that the basis for tuberculin therapy is essentially empiric.

Among the free subjects which attracted lively comments should be mentioned Lacarreré's electrodiaphakia, demonstrated on several cases at the Red Cross Hospital, Comberg's demonstration of the correctness of the Helmholtz accommodation theory by means of his new slitlamp on a subject he brought all the way from Germany with him; Troncoso's demonstration of goniscopy; Castroviejo's experimental work with corneal transplantation; Lopez Enriquez' slides demonstrating the phagocytic action of the retinal microglia, and Balbuena's slides showing the extrafoveal photoreceptor unit to be composed of a cone surrounded by rods.

The Committee on Standardization of Visual Requirements of Transport Workers made its report, and a summary of the requirements is already available.

The subjects of trachoma and classification of blindness were dealt with, but no notable progress made.

The scientific and industrial exhibits were on the whole less ambitious than those at Amsterdam, and their outstanding features were interwoven with the Congress papers and noted in that connection. Columbia University and Dr. Bedell participated in the scientific exhibit from the United States.

A resolution introduced from the floor at the Amsterdam Congress by Soria,

Lijo Pavia and the writer, has been sponsored by Nordenson and Coutela in committee, and passed at this Congress. Because of its importance, it deserves publication in full. It reads as follows (translated from the French):

"The XIV International Congress of Ophthalmology,

Considering that errors of refraction are true diseases and grave diagnostic mistakes are possible in connection with them; that the examination of the refraction of the eyes of children is of extreme importance and an incomplete or inexact correction may lead to harm later on; that errors of refraction in the adult and still more so in the aged may indicate or be the consequence of serious local and general disease (diabetes, glaucoma, cataract, etc.),

is of the opinion

1. That the examination of refraction is an essentially medical act.
2. That this (medical and competent) examination, and therefore the prescription of glasses, should be done exclusively by physicians.
3. That there are therefore urgent reasons to call the attention of Public Authorities to the campaign at present being led in certain countries to separate the examination of refraction from ophthalmology and make it the legal prerogative of practitioners (non-medical) calling themselves optometrists or optometric opticians or refractionists."

Those who read Spanish may be interested to learn that the Spanish ophthalmic classic "El Use de Antojos" by Benito Daza de Valdez, one of the illustrations of which has furnished the Congress emblem, was reprinted in 1923 on the occasion of the third centenary of its first publication in Leville and is available. It carries a delicious preface by Prof. Marquez in his usual genial literary style. The author was, by the way, neither a doctor nor an optician, but a modest notary, or scribe, in the Holy Office of the Inquisition, whose men, Prof. Marquez says, had to have some redeeming features about them.

Ramón y Cajal, too ill to carry out his original plan of opening the session devoted to the Detachment of the Retina, sent a message to the Congress instead, which reads in part as follows:

"Permit me from the depth of my retreat where I am spending my old age, to send my cordial and enthusiastic greetings to the celebrated foreign scientists who have taken the trouble to honor the modest Spanish science by bringing to it the fruits of their ophthalmic experience and their admirable theoretic studies in the mechanism of vision. I greatly deplore that my ailments prevent my collaborating today with my learned colleagues in the fruitful labors of the Congress. Perhaps, and I look forward to it, if my health permits, I shall contribute, if not to the Congress sessions, at least to the proceedings, a brief histophysiologic analysis of the doubtful or still unknown points in retinal architecture."

In addition, members of the Congress received as a souvenir a copy of a plaque with the head of Ramón y Cajal and a schema of the anatomy of the retina, the work of the well-known Spanish sculptor, Mariano Benlliure. If all members who attended the Congress have failed to receive it before leaving Spain, it is because, as Marquez said, the attendance exceeded all expectations.

The prevailing opinion was that the preconvention arrangements were excellently done by the Spaniards. There were five well printed and illustrated volumes of official papers, abstracts and album waiting for us, and the housing of the members, assembly hall and exhibit rooms all under the single roof of the spacious Palace Hotel was an excellent idea. There were the usual complaints by some members about the loud speakers not functioning properly, about the inadequacy in the announcement of speakers' names, and about the non-enforcement of time limits for speakers. The problem of too many official languages was a more serious complaint. It undoubtedly led to restlessness and reduced attendance at sessions. Its handicap was somewhat masked at Amsterdam by the use of simultaneous section meetings, where section shopping relieved linguistic inaccessibility. It should be noted, however, that the bulletins were in French, that most members who go to Congresses know two or more languages, that some actually used languages other than their own for the convenience of the others, notably the Spaniards, who made frequent use of French. A problem which should be considered in connection with the use of many official languages is that of facilitating discussion. This was meagre and undoubtedly inhibited by the language difficulty.

M. Davidson.

New York City.
June 6, 1933.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Hulla, F. **Etiology of iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 146-152.

The literature is reviewed and the statistics of various authors compared. The etiology in 222 cases, observed over a five-year period at the Prague Eye Clinic, is classified as follows: tuberculosis, 99, or 44. 59 percent; lues, 40, or 18.01 percent; rheumatism, 13, or 5.84 percent; gonorrhea, 5, or 2.25 percent; affections of teeth, 6, or 2.70 percent; inflammatory processes of adjacent cavities, 5, or 2.25 percent; otitis, 3, or 1.35 percent; angina, 2, or 0.90 percent; meningitis, 1, or 0.45 percent; sepsis, 1, or 0.45 percent; diabetes, 3, or 1.35 percent; herpes zoster, 1, or 0.45 percent; nephritis, nephrosclerosis, 6, or 2.07 percent; unknown, 27, or 16.66 percent. 135 cases occurred between the ages of twenty and fifty years when tuberculosis and lues are most prevalent. 45.94 percent were bilateral.

G. D. Theobald.

Kahoun, S. **Etiology and treatment of iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 269-277.

At the Brunn Clinic in the years 1927 to 1931, 233 cases of endogenous iridocyclitis were treated. According to etiology they were classified as follows: tuberculosis with positive finding, 61, or 26.4 percent; tuberculosis with probable finding, 54, or 23.4 percent; rheumatism, 42, or 18.1 percent; gonorrhea, 16, or 6.9 percent; lues, 15, or 6.4 percent; hypertony and nephrosclerosis, 7, or 2.8 percent; diabetes, 6, or 2.6 percent; nephritis, 3, or 1.2 percent; suppurative inflammation of adjacent cavities, 2, or 0.8 percent; chronic appendicitis, 1, or 0.4 percent; gout, 1, or 0.4 percent; without etiology, 25, or 10.7 percent. The greatest incidence was between the ages of thirty and forty years.

In general the tuberculosis cases were treated with old tuberculin, emulsion of bacilli,or nonspecific proteins. The best results were obtained in those cases in which specific therapy was combined with injections of milk in small doses. Nonspecific treatment was used in cases in which specific treatment was contraindicated on account of the physical condition. G. D. Theobald.

Knapova, F. **Tuberculous iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 153-160.

Among 222 cases of iridocyclitis which were observed at the Prague Eye Clinic over a five-year period, 44.59 percent were of tuberculous origin; 26.12 percent in males and 18.46 percent in females; 21.12 percent unilateral, and

23.42 percent bilateral. The highest incidence was between the ages of thirty and forty years. Foreign protein, chiefly milk injections, was used in most cases with good results. Tuberculin was used in a few cases with good results. Only two cases did not improve. A thirty-eight-year-old female had recurrent attacks with resulting atrophy. A fifty-nine-year-old female had recurrent attacks with pupillary seclusion and occlusion and complicated cataract.

G. D. Theobald.

Knobloch, Rudolf. **Modern treatment of uveitis.** Oft. Sbornik, 1932, v. 7, pp. 212-214.

Encouraged by the literature, the author used x-ray therapy in the treatment of twenty-three cases of nodular and chronic tuberculous iridocyclitis, with distinct and rapid improvement in sixty-five percent after failure of other therapy. The application of radium was analgesic but had no effect on the course of the disease. The author finds Koch's old tuberculin superior to newer preparations. He reviews the use of gold preparations (sanocrysin, chrysalgan) bismuth, apikosan, egg-yolk injections, and injections of various ovarian extracts. (Bibliography.)

G. D. Theobald.

Krause, A. C., and Chan, E. **The chemical constitution of the conjunctiva, choroid, and iris.** Amer. Jour. Physiology, 1933, v. 103, Feb., p. 270. (See Section 5, Conjunctiva.)

McGuire, H. H. **Gyrate atrophy of the choroid and retina (Fuchs).** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 172-179. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 86.)

Mazal, Vladimir. **Focal infection in iritis.** Oft. Sbornik, 1932, v. 7, pp. 196-203.

At the Brno Eye Clinic during a six-year period, the etiology of four cases of iritis was attributed to focal infections. The focus in one patient lay in diseased roots in the upper jaw; in two patients, in inflammation of the frontal and ethmoidal sinuses; and in one patient, in an acute appendicitis. The disappearance of the inflammation of the eye upon treatment of the primary focus confirmed the connection with the eye disease. (Bibliography.)

G. D. Theobald.

Reimova, Milada. **Blood sedimentation in uveitis.** Oft. Sbornik, 1932, v. 7, pp. 205-211.

At the Prague Eye Clinic, the Westergreen method of blood sedimentation was tested in thirty-four cases of iridocyclitis and five cases of chorioretinitis. The sedimentation time was normal in the five cases of chorioretinitis, the etiology of which was tuberculosis in two, lues in two, unknown in one. Among the nineteen iridocyclitis cases of tuberculous origin, the sedimentation time was normal in eleven and slightly increased in eight.

Among the seven iridocyclitis cases of luetic origin, the sedimentation time was slightly increased in one and greatly increased in six. Among the eight cases of rheumatic iridocyclitis, the sedimentation time was slightly increased in three and greatly increased in five. The cases observed showed that local affections of the uvea have in themselves no influence on the speed of sedimentation. Sedimentation has some importance in the differential diagnosis of tuberculous and rheumatic iridocyclitis.

G. D. Theobald.

Sattler, C. H. **Retrochoroidal hemorrhage in a case resembling retinitis circinata under the aspect of a sarcomatous tumor.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 190. (Ill.)

In a woman of sixty-one years complaining of visual disturbances of both eyes the papillo-macular region was dotted with yellowish foci like drusen. Within the next few years she developed white patches surrounding the macula at some distance, with slight hemorrhages. Then the sight of her right eye suddenly failed considerably. Temporalward from the macula was a sharply defined tumor elevated 8 D. and measuring about four disc diameters, suggesting the picture of sarcoma. Dia-

scleral transillumination gave a shadow. During the next few days hemorrhages set in in the retina and vitreous, reducing vision to light perception. As intraocular hemorrhages frequently occur in advanced retinitis circinata and an incipient sarcoma could have scarcely been overlooked at the last examination ten weeks previously, a retrochoroidal hemorrhage was diagnosed. Within six months it was absorbed leaving a white atrophic area, and vision had risen to counting fingers at 2.5 meters. C. Zimmermann.

Sawyer, M. M., and Schlossberg, T. **The effect of adrenalin instillation on the iris of normal animals.** Amer. Jour. Physiology, 1933, v. 103, Jan., p. 153.

Adrenalin, if instilled for a sufficiently long time into the conjunctival sac of normal cats or of rabbits, exerts an effect on the muscles of the iris. The effect of minimal doses is to cause constriction of the pupil. Larger amounts produce distinct mydriasis which is in some cases preceded and followed by a period of contraction. Previous removal of the nictitating membrane greatly increases the effect. Intravenous injection of adrenalin into a normal animal showing either contraction or dilatation of the pupil of one eye from previous instillation of adrenalin produces a more striking and more persistent mydriasis in that eye than in the normal one. M. E. Marcove.

Slavik, B. **Cysts of the iris.** Oft. Sbornik, 1932, v. 7, pp. 131-137.

Since 1926, four patients with cysts of the iris have been observed. Two were traumatic and two idiopathic. The latter two are reported in detail. In each of these cases, an incision was made with a Graefe knife and the cyst removed. The first, a 2.5 by 2.5 mm. cyst, was in a four-year-old boy and lay in the iris stroma near the edge of the pupil. It was lined with a cuboidal epithelium without pigment and covered in front with a thin layer of stroma. The second was in a fifty-seven-year-old man. Without preceding injury, the cyst developed in the course of about six months, and was treated elsewhere with x-ray. The 5 by 5 mm. cyst was lined with epithelium consisting of two layers of unpigmented polygonal and flat cells. Back of the cyst, the pigment epithelium was adherent to the anterior surface of the lens, and the cyst had hollowed out in it a plate-like cavity. (Ill.) G. D. Theobald.

Spillmann, J., and Rousseau, F. **Unilateral nodular inflammatory reaction of the iris, tuberculous in type, cured by methylic antigen.** Ann. d'Ocul., 1933, v. 170, April, pp. 328-333.

In an eight-year-old girl there was found a nodule of the iris with hypopyon. She was malnourished, and had enlarged cervical lymph nodes and hilus changes. The Wassermann was negative. The hypopyon promptly disappeared after use of atropin. The methylic antigen of Nègre and Boquet created local, focal, and general reactions. It was used therapeutically with improvement and after two years the eye was considered as cured. Fundus and vision were normal.

H. Rommel Hildreth.

Stastnik, Emanuel. **Can the sympathizing eye be operated upon?** Oft. Sbornik, 1932, v. 7, pp. 112-115.

Sympathizing eyes are operated upon only in case of secondary glaucoma. In 1922, the right eye of a man aged twenty-one years was injured by a tree branch with resulting atrophy of the eyeball. In 1926, secondary glaucoma developed. Anterior sclerotomy combined with iridectomy was done and under further treatment the sight improved from counting fingers at 10 mm. to "05/20". This condition lasted almost a year, at the end of which time phthisis of the cornea and iris appeared and vision was reduced to light perception and projection. G. D. Theobald.

Stastnik, Emanuel. **Our experiences in the treatment of iridocyclitis, especially tuberculous iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 216-222.

The author discusses the use of various mydriatics and miotics, the application of heat, lymphagogues, and foreign proteins. Calcium gluconate was given

intravenously to most cases on account of the rapid amelioration of pain and inflammation. Aphenyl and sodium thiosulphate, followed in twenty-four hours by intravenous injection of atophanyl and urotropin, were used with good results in cases of traumatic iridocyclitis. In tuberculous iridocyclitis, though the author has employed tuberculin, he doubts its efficiency. He puts more confidence in general hygiene, regulation of diet, and treatment with air, rest, and sun baths.

G. D. Theobald.

Vasek E. and Jindra, J. **On bone formation in the blind eye.** Oft. Sbornik, 1932, v. 7, pp. 255-259.

In an atrophic bulb, seventeen years after a severe perforating injury, an unusually hard bone was found completely filling the posterior segment. Even macroscopically, it could be seen to arise in tissue connected intimately with the choroid. Microscopically were seen homogeneous material, connective tissue, and areas of calcification and bone, in fact all stages of metaplasia described by other authors. (Bibliography.) G. D. Theobald.

Vejdovsky, V. **Sympathetic ophthalmia following cataract extraction.** Oft. Sbornik, 1932, v. 7, pp. 109-111.

In a man of 64 years, following cataract extraction, the iris healed in the wound. A seroplastic iridocyclitis developed and in three weeks the other eye became inflamed. The vitreous and fundus of the second eye could not be seen on account of lens opacities. Milk injections were used in combination with local treatment, but only after the primary eye was enucleated did the treatment have any effect and that was temporary. G. D. Theobald.

Woods, A. C., and Little, M. F. **Uveal pigment: hypersensitivity and therapeusis.** Trans. Sect. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 297-325. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 371.

Wostry, Milos. **Gonorrheal iritis and its treatment.** Oft. Sbornik, 1932, v. 7, pp. 161-171.

At the Brno Eye Clinic during a five-year period, sixteen cases of iritis secondary to gonorrheal infection were observed. All were in males between the ages of thirty and forty years. In eight cases, four of which had frequent recurrence, iritis preceded arthritis, and occurred from a few months to four years after the original gonorrheal infection. In four cases, a urethritis without gonococci was present, and in one case an epididymitis was provoked by gonovaccine.

Ten cases had unilateral iritis, one bilateral iritis. In five cases, inflammation attacked either eye at various times. Acute exacerbation occurred in four cases, recurrence in eight cases. The author classifies the forms as follows: twelve cases acute exudative iritis, four with hypopyon, four with hyphemia; four cases seroplastic iritis. The course ran from two to three weeks. Milk injections and gonovaccine combined with local medication were used in treatment with satisfactory results. In eleven cases the vision was improved; in three it remained unchanged, and in two it got worse.

G. D. Theobald.

8. GLAUCOMA AND OCULAR TENSION

Fasselova, M. **Iritis and hypertension.** Oft. Sbornik, 1932, v. 7, pp. 196-203. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Ferrari, A. **Tonometry and tonoscopy in pregnancy, labor, and the puerperium.** Arch. di Ottal., 1932, v. 39, Nov.-Dec., pp. 471-501.

After citing many workers who have interested themselves in this problem, the author passes to the results obtained by himself at the obstetric clinic of the University of Modena. He chose healthy women in the course of normal labor, and, for the major part, those who in the last stage of pregnancy had had normal vision and were without fundus lesion. The Schiötz tonometer and Bailliart's ophthalmodynamometer were used. The mean tonometric value was equal to 17.3 mm. of mercury in pregnancy, 17.5 mm. in labor, and 17.7 mm. in the puerperium. The mean

minimum tonometric tension obtained was equal to 15 mm. in pregnancy, 15 mm. in labor, and 16 mm. in the puerperium. The mean maximum tension was equal to 20 mm. in pregnancy, 20 mm. in labor, and 21 mm. during the puerperium. The fatigue of labor did not modify the intraocular tension. The normal tonoscopic value in pregnancy, labor, and the puerperium was found to be 40 mm. of mercury. In thirty cases the author observed that the retinal arterial diastolic pressure was less than 40 mm. of mercury. He discusses the possible causes of this decrease in the retinal arterial tension.

Herman D. Scarney.

Ferrari, A. **The action of extract of the anterior lobe of the hypophysis on the eye in normal and pathological conditions.** Arch. di Ottal., 1933, v. 40, Jan., pp. 1-16.

The author carried out experiments on rabbit eyes, on normal human eyes, and on human eyes with glaucoma. Instilled in the eyes of rabbits and in normal human eyes, the anterior lobe extract did not modify intraocular tension. By subconjunctival and intravitreous injection in rabbits the extract produced a considerable lowering of intraocular tension which lasts at the maximum about two hours, and with stronger doses (0.3 c.c. intravitreal) there was miosis. The reaction is more intense if the preparation is injected into the vitreous. The preparation does not produce hyperemia, conjunctival chemosis, alteration of the cornea, or clouding of the aqueous, and the caliber of the fundus vessels remains unmodified.

In the normal human eye, instillation of the extract into the conjunctival sac did not modify intraocular tension, but provoked miosis continuing up to eighteen hours and proportionate to the dosage. It did not produce hyperemia, chemosis of the conjunctiva, or alteration of the cornea. In the human glaucomatous eye, the extract had no effect on the intraocular tension or on amplitude of the pupil by either instillation or subconjunctival injection. Hypodermic injection of the extract in normal or in glaucomatous human subjects, or intravenous injection in rabbits, never produced any variation of ocular tension or in amplitude of the pupil.

Herman D. Scarney.

Löhlein, W. **Contribution to the etiology of juvenile glaucoma.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 524.

In a fifteen year old boy with bilateral glaucoma simplex on which Elliot trephining was successfully performed, the palpebral, conjunctival, and retinal vessels were and remained engorged. This was probably brought about by a disturbance of sympathetic innervation likely related to a syringomyelia which was later diagnosed. The author also believes that in this instance the glaucoma was an expression of disturbed sympathetic function brought about by the syringomelia.

F. Herbert Haessler.

Meyerhof, M. **Atrophy of the iris in an early stage of chronic glaucoma.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 115-120.

Six cases are reported, one following a single attack of acute glaucoma and five in the prodromal stage of glaucoma. In four of the latter cases, beside the patients' subjective feelings during the prodromal attacks, there were no other signs of the presence of glaucoma than rather advanced atrophy of the iris. The author believes that these atrophies are not materially different from those observed in the late stages of chronic hypertension, and he attributes them to obliteration of certain branches of the anterior ciliary arteries by increased tension.

Edna M. Reynolds.

Sobanski, K. **Negative registrations from the Schiötz tonometer.** Klin. M. f. Augenh., 1933, v. 90, March, p. 383. (Ill.)

Sobanski finds that negative registrations may be avoided if the concave foot plate of the tonometer is made interchangeable with plates of concavity corresponding to the corneal radius. Three sizes may be sufficient.

C. Zimmermann.

Velhagen, K., Jr. **Preliminary communication on the new miotic doryl.** Klin. M. f. Augenh., 1933, v. 90, April, p. 512.

Doryl (carbaminvylcholin, a cholinester), very much diminishes pathologically increased ocular pressure in 0.75 percent solution, which is at least equivalent to two percent pilocarpin solution and is very stable.

C. Zimmermann.

Weeks, W. W. **Choice of operations in secondary glaucoma.** Amer. Jour. Ophth., 1933, v. 16, April, p. 301.

9. CRYSTALLINE LENS

Ballantyne, A. J. and others. **Symposium on pre- and post-operative management of senile cataract and its complications.** Trans. Ophth., Soc. United Kingdom, 1932, v. 52, pp. 74-99.

Ballantyne feels that the pre-operative care and preparation should be largely directed to elimination of possible operative and post-operative infection. He emphasizes the value of general examinations for diabetes, syphilis, tuberculosis, septic teeth, and other obvious sources of focal infection; also for heart disease, bronchitis, asthma, and emphysema. Endogenous infections usually cause nonpurulent infections, especially iritis. He treats these with salicylates and inunctions of mercury. Post-operatively he covers both eyes, does not bandage the unoperated eye, and uses only the lightest bandage on the operated eye as thereby astigmatism is reduced.

Arnold Lawson contends that if for eight to twelve hours no discharge is present on the lashes, in the canthi, or on the pad placed over the closed eye the eye is surgically clean; that the lysozyme keeps the normal conjunctiva clean no matter what pyogenic organisms are placed in it. Patients with high blood pressure should spend a week or ten days in bed before the operation; and when diabetes or renal disease is present a preliminary iridectomy is wise.

H. M. Traquair thinks that dementia is less frequent with the increasing use of periorbital anesthesia. Richard Cruise gives sedatives and occasionally hyoscin and morphia, with atropin. W. B. Inglis Pollock has had four cases of sympathetic ophthalmia following cataract extraction. Further discussion was by Maurice Whiting, R. Affleck Greeves, R. Foster Moore, A. E. J. Lister, R. E. Wright, H. T. Holland, and A. F. MacCallan.

Thomas D. Allen.

Barraquer, Ignacio. **Accidents and complications occurring in the intracapsular extraction of senile cataracts.** Amer. Jour. Ophth., 1933, v. 16, May, p. 385.

Gifford, S. R., Lebensohn, J. E., and Puntenny, I. S. **The biochemistry of the lens: permeability of the capsule of the lens.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 206-232. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 83.)

Lopez Lacarrère, J. **Electrodiaphakia. Determination of the penetrating and tractive force on the crystalline lens.** Ann. d'Ocul., 1933, v. 170, April, pp. 273-289. (See Amer. Jour. Ophth., 1932, v. 15, Oct., p. 1001; and v. 16, Feb., p. 178.)

Mazzi, L. **Particular biomicroscopic aspects of endocrine cataracts.** Arch. di Ottal., 1933, v. 40, Jan., pp. 32-48.

Two cases are described and illustrated. The author believes that there are particular forms of opacity of the crystalline lens caused by endocrine dysfunction, through disturbances of nutrition of the lens from endocrine disturbance of iris and choroid. Such cataracts may be confused with other forms and sometimes are associated with other forms, but in their typical state they reveal with certainty the existence of a disturbance of the endocrines. (Bibliography.)

Herman D. Scarney.

Sinclair, H. H. **Presidential address.** (Development of cataract extraction.) Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. LII-XCVII.

Sinclair reviewed for his presidential address the development of cataract extraction from Daviel (1745) to the present time. The first intracapsular operation apparently was done by Samuel Sharp, an Englishman, in 1753. The author does canthotomy and gives retrobulbar injections, and makes almost a 180 degree section of the cornea and a large conjunctival flap in which he places a suture. If the pupil does not dilate more than 6 mm. he does complete iridectomy, otherwise peripheral iridectomy. His choice of intracapsular or extracapsular operation depends upon three points: (1) type of cataract, (2) relation of the eye to surrounding parts, (3) behavior of the patient. He describes in detail the steps of the operation and the common complications and his method of handling them. He is less concerned by escape of fluid vitreous than of normal vitreous. He analyzes the results of 309 cataract operations. Thomas D. Allen.

Wright, R. E. **Details of cataract extraction.** Amer. Jour. Ophth., 1933, v. 16, March, p. 228.

10. RETINA AND VITREOUS

Agatston, S. A. **Experimental hypertension and retinal arterial spasm.** Amer. Jour. Ophth., 1933, v. 16, April, p. 327.

Attiah, M. A. H., and Sobhy Bey, M. **A case of detachment of retina with tubular cysts resembling parasites.** Bull. Ophth., Soc. Egypt, 1932, v. 25, pp. 121-124.

The case is reported with fundus photographs. The cause of the cysts was not determined but the authors suggest from their appearance that they were parasitic in origin.
Edna M. Reynolds.

Barrada, M. A. **Thrombosis of the central vein of retina.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 125-130.

A case of thrombosis of the central retinal vein in a young woman aged twenty-one years is reported. None of the known constitutional causes of thrombosis were found but the fundus showed greatly exaggerated curves of arteries and veins. This congenital anomaly the author regards as a strong predisposing factor to the thrombosis, probably associated with some remote septic focus which was not discovered. The literature regarding the occurrence of thrombosis of the central retinal vein in young subjects is reviewed and the causes of thrombosis are summarized.
Edna M. Reynolds.

Clay, Grady. **Angioid streaks of the retina and pseudoxanthoma elasticum.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 182-199. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 85.)

Evans, J. N. **The scotometry of retinal edema.** Amer. Jour. Ophth., 1933, v. 16, May, p. 417; also Trans. Amer. Ophth. Soc., 1932, v. 30, p. 298.

Ferrari, A. **Tonometry and tonoscopy in pregnancy, labor, and the puerperium.** Arch. di Ottal., 1932, v. 39, Nov.-Dec., pp. 471-501. (See Section 8, Glaucoma and ocular tension.)

Friedenwald, J. S., and Chan, E. **Pathogenesis of retinitis pigmentosa, with a note on the phagocytic activity of Müller's fibers.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 271-279. (See Amer. Jour. Ophth., 1932, v. 15, Dec., p. 1201.)

Goulden, Charles. **Spontaneous and traumatic detachment of the retina and its modern treatment.** Irish Jour. Med. Science, 1932, No. 84, Dec., p. 679.

This paper deals with the theories of etiology of retinal detachment, the detailed technique of the Gonin cautery puncture, the Guist caustic operation, and the operation by diathermy. Statistics are given regarding percentages of cures by various operations and various surgeons. Ralph W. Danielson.

Lindner, K. **The making of models for experiments in detachment of the retina.** Klin. M. f. Augenh., 1933, v. 90, March, p. 289. (Ill.)

The models, differing for different purposes, include: (1) models for dem-

onstrating to the patient the deleterious influence of ocular rotation upon detached retina; (2) models showing the process of detachment after a tear has occurred; (3) models of the vitreous explaining the forces which create a tear. C. Zimmermann.

McGuire, H. H. **Gyrate atrophy of the choroid and retina (Fuchs).** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 172-179. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 86.)

Péretz, H. **Observations regarding operation for detachment of the retina by the Gonin method and by the Sourdille method.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 51-55.

Following a brief summary of the various theories regarding the etiology of detachment of the retina, the author contrasts the Gonin and Sourdille methods of operation. From his observations of results obtained by these methods, he believes that for the majority of Egyptian patients the Gonin method is unsuitable, because so many of them are monophthalmic and have corneal lesions. The serious complications which follow thermocauterization make the Gonin operation hazardous in monophthalmic patients and accurate localization of retinal tears is impossible in many patients because of corneal opacities. A summary of six cases successfully operated upon by the author by the Sourdille method concludes the article. Edna M. Reynolds.

Riehm, W. **Neurofibrillitis retinae (Jensen).** Klin M. f. Augenh., 1933, v. 90, Feb., p. 154. (Ill.)

For deciding the question as to the primary seat and the etiology of this disease, first described in 1908 by E. Jensen under the name of retinochoroiditis juxtapapillaris, Riehm considers cases of slightest course best adapted. He therefore reports the clinical histories of three relatively mild cases observed within a short time, all presenting the characteristic symptoms of Jensen's disease, and not complicated by participation of the anterior uvea or secondary hypertension. In case one several small inflammatory exudative nodules developed in the retina in the vicinity of the main focus, and in case three the affection was more in the disc than in the fibrous tissue of the retina, and left no changes in choroid or pigment epithelium after healing. In all three the smallest dose of old tuberculin was followed by a general reaction, suggesting tuberculosis as the chief etiological factor. That the retina is affected primarily is further demonstrated by the fact that very frequently in the published cases the choroid and pigment epithelium did not participate. The greatest dimension of oval foci in the direction of the retinal nerve fibers, and the absence of defects of the visual fields in severe choroiditis in contrast to their presence in Jensen's disease, also speak for the primary seat being in the retina. The author therefore recommends the term neurofibrillitis of the retina for the disease.

C. Zimmermann.

Rossi, G. **Disturbances of the retinal circulation in epileptics.** Arch. di Ottal., 1932, v. 39, Nov.-Dec., pp. 502-519.

The author analyzes two cases as to the circulatory theory of epilepsy. The first case showed angiospasm of the retinal circulation during the attacks and, in the author's opinion, the intracranial circulation was affected by some morbid agent which produced a vasospastic condition with consequent explosion of the epileptic symptoms. By associating the radiological, clinical, and ophthalmoscopic symptoms, he feels that a state of intracranial hypertension existed. In the second case, he also feels that there the presence of a cerebral arterial change was supported by x-ray and historical data.

Herman D. Scarney.

Sabata. **Floculus of the anterior chamber.** Oft. Sbornik, 1932, v. 7, pp. 248-249.

In mother and son, a brown body was discovered in the anterior chamber of the left eye. In the mother, the body was fixed by a fine cord, extending from the back of the iris (the pars iridis

retinae.) In the son, it was not attached and was movable with change of position, the brown velvety body being clearly seen against the blue iris.

G. D. Theobald.

Salus, Robert. **Operation for detachment of the retina with electrocoagulation.** Klin. M. f. Augenh., 1933, v. 90, April, p. 516.

Salus reports on further experiments on twenty animal eyes, in which he produced detachment of the retina by electrocoagulation with strong currents, creating a transudation from the choroidal vessels into the subretinal space. This showed the danger of electrocoagulation beyond a certain limit. As illustrated by an old case of human detachment, the healing tendency was strong enough to overcome operative perforation of the retina, so that by cautious employment perforating diathermy may prove very useful.

C. Zimmermann.

Sattler, C. H. **Retrochoroidal hemorrhage in a case resembling retinitis circinata under the aspect of a sarcomatous tumor.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 190. (Ill.) (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Shapland, C. B. **Retinal detachment and Gonin's operation: a statistical survey. Some observations on bilateral symmetrical detachment of the retina.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 170-202.

In the previous volume of these transactions the author analyzed the first hundred cases of simple detachment of the retina treated at Moorfields Hospital by the Gonin method: the present report is a similar study of the second hundred cases. Fifty-six were in males, 44 in females; 27 percent were discharged cured, 17 percent improved; two of the twenty-seven relapsed. A cure was effected in 24 percent of the high myopes, 21 percent of the low myopes, 30 percent of the emmetropes, and 25 percent of the aphakics. Thirty-one percent of the round hole cases were cured, 26 per cent of the arrowhead hole cases, 23 per cent of the oral tear cases, and 17 percent of the slitlike tear cases. As to the duration of detachment: under six weeks 40 percent were cured with one operation; six weeks to three months, 28 percent were cured with two operations; three to six months, 22 percent were cured with three cautery punctures; and over six months 10 percent were cured with four operations. If the macula is involved and the case has been successfully treated, central vision usually returns to 6/36 or 6/24. There were three cases of complete vitreous hemorrhage, one of subretinal hemorrhage, and two of transient uveitis. Shapland feels that cautery puncture is the operation of election for recent cases with a single round hole not exceeding 2 mm. in diameter, disinsertion (oral tear) not exceeding 5 mm. in length, or a horseshoe-shaped hole sufficiently small to require not more than two operations to seclude it.

He had five bilateral symmetrical examples among 281 cases. The detachment commences in the inferior temporal quadrant in or near the ora serrata, extends slowly, and shows a marked tendency to become delimited. The prognosis is relatively good, the operative results excellent.

Thomas D. Allen.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Busacca, A. **Sulphur treatment of luetic atrophy of the optic nerve and other eye diseases.** Klin. M. f. Augenh., 1933, v. 90, March, p. 352.

Busacca treated four cases of luetic atrophy of the optic nerve with intramuscular injections of sulphur according to Winkler's method. This consists of ten weekly injections of varying dosage of sulphur dissolved in oil, beginning with 0.5 mg. of sulphur and increasing to 2 mg. in combination with antiluetic therapy. Although the cases are too few and the time too short for final judgment, Busacca believes that so far no other method has yielded such speedy results in such a high percentage of cases. After each injection, even if no fever was produced, hyperemia

of the disc and retina was observed the next day. Vision was impaired for the first two days. Most striking was the improvement of central and peripheral color sense. Good results were also obtained in a case of chorioretinitis. The blood showed diminution of neutrophiles. C. Zimmermann.

Fleischer, B. **Fever treatment of tabetic atrophy of the optic nerve.** Klin. M. f. Augenh., 1933, v. 90, March, p. 335.

After a review of the literature, Fleischer states that he observed no damage from malaria treatment of eight cases of tabetic atrophy; while in cases long kept under observation a decidedly favorable influence in arresting the disease was noticed. In two cases he produced fever by injections of "sulfosin" (a sulphur compound) which may be a more easily controllable substitute for the malaria treatment.

C. Zimmermann.

Haas, E. and Schmidt, K. **The question of nonoperative treatment of retrobulbar neuritis.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 449.

The authors present an analysis of all cases, twenty-six in number, of retrobulbar neuritis which have been treated at the Bonn Clinic since 1921. In twelve of these in which the etiology was not clear surgical treatment might have been considered. Römer, however, recommends for operation only those individuals in whom a nasal operation is indicated for a rhinological reason. The unilateral affections all got well, as they usually do, and forty percent of the cases of bilateral neuritis healed spontaneously. Taking all this material together, nine out of twelve patients recovered. Operative therapy could hardly do better.

F. Herbert Haessler.

Mazal, Vladimir. **Neuromyelitis of the optic nerve.** Oft. Sbornik, 1932, v. 7, pp. 250-254.

In 1930 a thirty-four-year-old man with acute optic neuritis became blind three days after entering the hospital. Blood and spinal Wassermann reactions were negative; Pirquet + +: urine free from albumin and sugar. The cerebrospinal fluid indicated an inflammatory process in the central nervous system. Fifteen days after onset of the ocular symptoms, an acute transverse myelitis developed. He died six days later at home. No section was made. The spinal fluid showed increase of albumin and leucocytes. The gold curve was of a paralytic type. No organisms were found. X-ray findings of the spinal column were negative. On account of the strong positive Pirquet reaction, the etiology might be tuberculosis. G. D. Theobald.

Springovitsch, Gertrud. **On the results of treatment of atrophy of the optic nerve with retrobulbar injections of atropin.** Klin. M. f. Augenh., 1933, v. 90, March, p. 343. (Ill.)

In 1924 Abadie reported a case of atrophy of the optic nerve which he had cured with retrobulbar injections of atropin. Springovitsch reports on twenty-eight patients with atrophy of the optic nerve, in whom fifty-one eyes were so treated. The technique is described in detail. Her observations indicate that this treatment may not only arrest the failure of vision but if administered early may improve and in some cases completely restore vision.

C. Zimmermann.

Stiefbold, Ernst. **Changes of the optic nerve after traumatism, or early symptoms of multiple sclerosis.** Klin. M. f. Augenh., 1933, v. 90, March, p. 387.

Wiedersheimer had described (Klin. M. f. Augenh., 1926, v. 76, p. 707) the case of a boy aged fifteen years who in chopping wood sustained a contusion of the right upper orbital margin, with intense impairment of sight from a large central scotoma and papillitis after three or four days. Rapid improvement took place, with restoration of full central vision, but slight pallor of the disc, especially in its temporal portion, and ring scotoma. After eight years ocular and neurological examination clearly revealed multiple sclerosis. The authors now assume that

the alteration of the optic nerve in 1924 was an early symptom of multiple sclerosis and that a latent sclerotic focus of the optic nerve was activated by the trauma. C. Zimmermann.

Vogt, Alfred. **Dyscephaly (dysostosis craniofacialis, maladie de Crouzon 1912) and a novel combination of this disease with syndactyly of the four limbs (dyscephalodactyly).** Klin. M. f. Augenh., 1933, v. 90, April, p. 441. (Ill.)

A case of dyscephaly (Crouzon's disease) in a girl of three and a half years is described; the chief symptoms being unusual brachycephaly with excessive protuberance of the region of the large fontanelle, inferior prognathism, abnormally wide interocular distance, exophthalmos from narrowing of the orbit, divergent strabismus, choked disc, and optic atrophy. In a second patient, a girl of nine years, the typical deformitories were combined with Apert's syndactyly of all extremities. C. Zimmermann.

12. VISUAL TRACTS AND CENTERS

Attiah, M. A. H. **An analysis of a few cases of pituitary tumors and others in relation to sella turcica.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 131-149.

As an introduction to his case reports, the author gives a brief discussion of the anatomy and functions of the pituitary body, together with a review of the local and general pressure effects of intrasellar and suprasellar tumors. Two cases of intrasellar tumor are presented and three cases of suprasellar tumor. Edna M. Reynolds.

Bartley, S. H. **Action potentials of the optic cortex under the influence of strychnine.** Amer. Jour. Physiology, 1933, v. 103, Jan., p. 203.

Strychnine, when sparingly applied to an area of 2 by 4 mm. of the rabbit's optic cortex, reduces the oscillograph records of the spontaneous activity of large portions of the cortex to almost nothing. During this reduction, large simple waves spontaneously appear, first singly and then in groups of varying numbers, in and also at some distance from the drugged region. The normal cortical response to stimulation of the optic nerve, consisting of five potential waves, is reduced to a single first component in the area noticeably affected by strychnine. This single component can be elicited directly from the changed cortex only at the drugged region, but conducts from here to more distant regions. M. E. Marcove.

Demetriadis, Jean. **A case of homonymous hemianopsia with diagnosis of the location of the lesion.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 150-154.

The patient, aged fifty-two years, complained of being unable to distinguish objects in the left half of the field of vision. He gave a history of recurrent attacks of tremors and rigidity resembling Jacksonian epilepsy, accompanied by micropsia and macropsia together with a sensation of falling away of the ground beneath his feet. Ocular examination was negative except for an abnormal mydriasis and sluggish pupillary reactions. Examination of the visual fields with the perimeter showed homonymous hemianopsia sparing the macular region in each eye. Examinations of blood and spinal fluids were normal. The author reviews the visual pathway and locates the brain lesion in the right external geniculate body. Edna M. Reynolds.

Horrax, G., and Putnam, T. J. **Distortions of the visual fields in cases of brain tumor. The field defects and hallucinations produced by tumors of the occipital lobe.** Brain, 1932, v. 55, Dec., p. 499.

This is based on material from the Cushing clinic. Intracranial tumors confined to the occipital lobes are comparatively rare, only forty occurring in a series of 1,881 verified intracranial growths. In an extremely large proportion (73.6 percent) of patients having tumors confined to or chiefly compressing the occipital lobe, the field of vision showed a contralateral homonymous hemianopsia in which the central fibers remained unaffected. The authors agree with Allen in explaining sparing of the macula by the theory that so long as

a minimal number of visual fibers remain undestroyed or completely compressed, together with preservation of the cortex of the occipital lobe, central vision remains unimpaired. An upper quadrantal homonymous defect of the fields was not disclosed in any case of the series. Visual hallucinations occurred in fifteen percent of cases before operation.

The authors believe that the differential diagnosis between temporal and occipital tumors may be impossible without ventriculography. The high incidence of spared central fibers, together with the rarity of upper quadrantal defects in the latter, is helpful, since bisection of the macula and upper quadrant anopsia are frequent in the former. Other differential features are the relatively greater tendency to the true quadrantic form (bounded by the horizontal meridian) in defects due to temporal lobe lesions, and their greater incongruity as compared with those due to tumors of the occipital lobe. (Eight case reports, sixteen figures, and twelve references.)

Ralph W. Danielson.

Riegel, E., and Vogelsang, K. **Central scotoma with chiasmal disease.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 433.

In five cases of chiasmal lesion observed in two years the authors found bilateral central scotoma, which leads them to remark that this finding is not so very rare. It is important to realize that the papillomacular bundle undergoes decussation in the chiasm and that in the posterior part of the chiasm it lies fairly dorsal under the recessus of the third ventricle. If a tumor is small and lies chiefly on one side of the chiasm a unilateral scotoma may result. The relation to the temporal lobe must be remembered in view of the fact that it has been pointed out that central scotoma is a reliable sign in lesions of the temporal lobe. It is of clinical importance to consider chiasmal lesions in the differential diagnosis of equivocal cases of early multiple sclerosis and to carefully analyze bitemporal hemianopsias before diagnosing a chiasmal lesion. The central scotoma is easily demonstrable on the Bjerrum screen.

F. Herbert Haessler.

Vogelsang, K. **Temporal atrophy of the optic nerve in diseases of the chiasmal region.** Klin. M. f. Augenh., 1933, v. 90, April, p. 494.

Two cases of temporal atrophy of the optic nerve with central scotoma and symptoms pointing to the region of the chiasm are described. In all uncertain cases of temporal pallor it ought to be a rule to test central and peripheral fields of vision for bitemporal defects and to take roentgen pictures of the sella.

C. Zimmermann.

13. EYEBALL AND ORBIT

Azmy El Kattan, M. **A case of pulsating exophthalmos due to arterio-sinus communication.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 171-175.

A case of pulsating exophthalmos of twenty-five years' duration after a head injury is reported. Of unusual interest is the fact that in spite of the long duration of the arterio-sinus communication, the central retinal vein is of normal caliber. The author explains this by the fact that the central vein of the retina often empties into the inferior ophthalmic vein and thus through the inferior orbital fissure gets a communication with the pterygoid plexus and does not reach the cavernous sinus.

Edna M. Reynolds.

Barrada, M. A. **A case of proptosis due to mixed sarcoma.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 169-170.

A case due to a mixed sarcoma is reported in which the outstanding feature was rapid development of the proptosis. Within a week the eye was pushed forward so that almost the entire globe was outside the orbit. Exenteration of the orbit showed diffuse infiltration of all the retrobulbar tissues.

Edna M. Reynolds.

Merrill, H. G., and Oaks, L. W. **Extreme bilateral exophthalmos.** Amer. Jour. Ophth., 1933, v. 16, March, p. 231; and Trans. Pacific Coast Oto-

Ophth. Soc., 1932, 20th annual meeting, p. 147.

Merrill, R. H. **The morphology of microphthalmos with coloboma in the histological picture and the reconstruction model.** Klin, M. f. Augenh., 1933, v. 90, April, p. 454. (Ill.)

The microphthalmic left eye of an infant of three days with optic fissure open in its whole length, but without retino-orbital cysts, is described anatomically. Morphological and histological comparison of the forms of microphthalmos with and without orbital cysts leads to the conclusion that both belong genetically together and are best designated as microphthalmos with external (orbital) cysts and microphthalmos with internal (bulbar) cysts. C. Zimmermann.

Schmidt, K. **Investigations of the change of vascular permeability in enucleated rabbit eyes and a further attempt to determine the absolute quantity of blood in the rabbit eye by means of radioactive indicators.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 427.

Radioactive substance enters the aqueous and vitreous from vascular tissues of the eye more rapidly after enucleation than in vivo. With a time interval of ten minutes forty-five percent more radioactive substance is found in the aqueous of the eye which was enucleated last. For the vitreous the proportions are similar except that an equal quantity of vitreous contains only one-tenth as much radioactive substance as the aqueous. It is assumed that this fact demonstrates that the vitreous has much slower metabolism than the aqueous. A further study of the absolute blood content of the rabbit eye shows that it contains 4.6 percent of blood by weight.

F. Herbert Haessler.

Wostry, M. **Tuberculosis of the orbit.** Oft. Sbornik, 1932, v. 7, pp. 260-265.

A female aged thirty-four years had noticed for about four weeks a growing nodule at the inner canthus of the left eye. It was 0.5 by 1 cm. in size, not attached to bone or lid, but extending back into the orbit. Old healed lesions were found in the lungs. The Bordet-Wassermann was positive and a Pirquet strongly positive. Histologically, the tissue was regarded as a tuberculoma. The Ziehl-Nielson stain showed acid-resisting granules in the giant cells. G. D. Theobald.

14. EYELIDS AND LACRIMAL APPARATUS

Alexander, G. F. **Lip graft operation for trichiasis.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 162-169.

The author emphasizes the necessity of a stout, sharp double-edged knife with a good point, a special lip graft clamp, and a toothless forceps. Adrenalin is not used on account of post-operative exudate. The section should be not over 3 mm. deep. The graft should be free from fibro-fatty tissue.

Thomas D. Allen.

Blair, V. P. **Repairs and adjustments of the eyelids.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 328-339. (See Amer. Jour. Ophth., 1933, v. 16, March, p. 277.)

Grüter, Wilhelm. **A fungus mass in the upper tear duct.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 477.

A mass removed surgically from the tear duct proved to be mycelium of a fungus. Extensive studies by means of cultures and animal inoculations show that the organism belongs to the family actinomycetes. However, it is not precisely similar in all respects to forms previously described. The author names it actinomyces discofoliatus.

F. Herbert Haessler.

Igersheimer, J. **Calcification of the lacrimal gland in the roentgen picture.** Klin. M. f. Augenh., 1933, v. 90, April, p. 473. (Ill.)

A man aged thirty-nine years was suddenly affected with exophthalmos and swelling of the left side of the face. The region of the orbital lacrimal gland showed marked resistance and was painful, and the upper temporal part of the ocular conjunctiva was injected.

The optic disc was hyperemic, its margins indistinct, and the veins congested. Roentgen rays showed a mulberry-shaped shadow at the upper temporal margin of the orbit. In photographs of the patient of 16 years previously the left eye appeared slightly exophthalmic. The inflammatory symptoms soon subsided. The differential diagnosis between tumor, exostosis and phleboliths is discussed and is decided in favor of calcified tuberculosis of the lacrimal gland. C. Zimmermann.

Sabata. **Phthiriasis of the lids clinically simulating trachoma.** Oft. Sbornik, 1932, v. 7, pp. 282-284.

A ten-year-old boy, whose father suffered from trachoma, developed a conjunctivitis very similar to trachoma. Many pediculi were found along the lid margins. These were treated with mercury ointment and the conjunctiva with astringents. The lids rapidly became normal. The seven-year-old brother developed the same condition. Treatment was limited to eradication of pediculi, and resulted in return of the conjunctiva to normal.

G. D. Theobald.

Salvati, G. **A contribution to the study of acute dacryoadenitis.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 157-168.

The author gives histories of fourteen cases of acute dacryoadenitis. Two of the cases were unilateral and were due to local causes. One was associated with a hordeolum and the other with advanced trachoma. In the latter case the glandular hypertrophy subsided as cicatrization of the trachoma began. The remainder of the cases were bilateral and were due to general causes. Seven occurred during a gonorrheal urethritis, two during a parotitis, one after a throat angina, one during pyelonephritis, and one during the last month of pregnancy. In all cases there was definite parallelism between the course of the dacryoadenitis and the concomitant affection. The outcome was favorable in all cases, the cure rapid and without suppuration.

Edna M. Reynolds.

Sobhy Bey, M., and Tobgy, A. F. **Poliosis of the cilia with (unusual) parasitic origin.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 155-156.

(In the above title the editor has substituted "unusual" for the authors' pseudo-English "queery" evidently used in the sense of "unusual".)

This is a case of loss of color of the eyelashes due to the presence of a hair-mite of unusual classification.

Edna M. Reynolds.

Traquair, H. M. **External dacryocystorhinostomy.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 149-162.

Of 117 Toti operations seventy-one percent reported no tearing after operation. Of forty-eight excisions forty-four percent so reported. Out of six cases with excision on one side and Toti's operation on the other, two reported watering on both sides, one watering on neither side, and three no watering on the side of the Toti but watering on the other. The author details his technique.

Thomas D. Allen.

Wegner, W. **Thorium dioxide in examination of the tear sac.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 532.

That thorium dioxide injected into the tissues is not harmless is shown by its effect in two patients in whom the surrounding tissue was inadvertently infiltrated during an attempt to fill the tear sacs for roentgenologic study. One of them developed a mass in the orbit twelve years after the injury. In the other patient orbital inflammation with disturbance of bulbar motility developed within one year.

F. Herbert Haessler.

Whiting, Maurice. **Syphilitic tarsitis.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 140-148.

An unmarried woman, twenty years old, had four swellings of a lower lid of three weeks duration. There was no pain, tenderness, or glandular enlargement. When incised the masses were fibrous and avascular: microscopically they were reported as inflammatory fibrous tissue. The Wassermann was

negative but neosalvarsan was given with immediate improvement. When the treatment was discontinued the masses increased in size; but on further treatment they disappeared without leaving a trace. In discussion Fisher reported a case in a patient with old interstitial keratitis, old posterior synechiae, and peripheral disseminated choroiditis. (Bibliography.)

Thomas D. Allen.

15. TUMORS

Bardanzellu, T. **A new method of surgical treatment of subcutaneous angiomas of the face.** Arch. di Ottal., 1932, v. 39, Nov.-Dec., pp. 520-543.

The author's treatment of angioma of the face consists in passing subcutaneous catgut ligatures through the body of the angioma to cut off the profuse blood supply to these areas. The method is described in detail and the author gives a review of the results in three cases so treated. (Ill.)

Herman D. Scarney.

Davis, W. T. **Metastatic carcinoma of the optic disc; with report of a case.** Trans. Sect. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 248-255. (See Amer. Jour. Ophth., 1932, v. 15, Dec., p. 1205.)

Gallenga, C. **Teratogenesis of some embryomas of the temporal conjunctival pocket.** Klin. M. f. Augenh., 1933, v. 90, April, p. 434.

In the interpretation of embryomas at the temporal retrotarsal fold one must think of possible retardation of the connection or fusion of embryonal processes participating in the formation of the soft tissues with parts of the skeleton. This fusion takes place between the twenty-fifth and twenty-eighth days of pregnancy. Retardation favors the inclusion of small elements of mesenchyma and minimal parts of the ectoderm, which present the starting points for various teratomas.

C. Zimmermann.

Kurz, Jaromir. **The finding of tumors of the iris in a case of neurofibromatosis.** Oft. Sbornik, 1932, v. 7, pp. 294-295.

A young woman of twenty years gave a history of swelling and ptosis of the right upper lid since her fourteenth year. Physical examination showed multiple lesions over her body with rather large defects in the bones of the skull. The terminal branches of the nerves of the cornea were nodular. In the iris stroma lay many small wartlike tumor formations which were light brown in color.

G. D. Theobald.

Moulton, H. and E. C. **Sarcoma of the choroid: history of six cases, with early operation.** Trans. Sect. on Ophth. Amer. Med. Assoc., 1932, 83rd annual session, pp. 136-143. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 90.)

Polakov, P. L. **A rare case of metastatic carcinoma of the orbit.** Sovietskii Vestnik Opht., 1932, v. 1, no. 12, p. 502.

The patient, a woman aged fifty-eight years, was operated on for carcinoma of the external genitalia with axillary metastasis prior to onset of orbital symptoms. A tumor mass the size of a walnut was seen on the temporal side of the eyeball about 1.5 cm. from the limbus. During operation for removal of the tumor, the latter was found to extend 3 to 4 cm. into the orbit. Microscopically the diagnosis of squamous-cell epithelioma was made.

M. Beigelman.

Slavik, B. **Metastatic chorionic epithelioma of the choroid.** Oft. Sbornik, 1932, v. 7, pp. 142-145.

Three and one-half years after removal of a chorionic epithelioma, the patient, aged fifty-four years, developed terrific pain in her head and right eye. She complained of poor vision and the tension was high. A tumor of the choroid adjacent to the disc was found. This was accompanied by subretinal, retinal, and subconjunctival hemorrhages. Several days after enucleation, death followed severe intestinal hemorrhage. Metastases were found in the pelvis, lungs, kidneys, and intestinal walls. Histological examination showed a myxomatous tumor of the choroid, posterior to the equator. The cells were

cuboid, oval, or polygonal, of varying sizes, even to giant cells often with vacuoles and rich in chromatin. The retina was detached by hemorrhage.

G. D. Theobald.

Stastnik, Emanuel. **A case of melanosarcoma of the uveal tract treated with x-ray.** Oft. Sbornik, 1923, v. 7, pp. 138-141.

A forty-nine-year-old woman gave the history of failing vision for three months. The iris, ciliary body, and choroid were involved in a pigmented tumor. X-ray in large doses was used over a period of five months. At the end of the third month, the tumor appeared smaller, but later the lens became dark and increased tension developed. Enucleation was performed.

G. D. Theobald.

16. INJURIES

Attiah, M. A. H., and Kattan, M. A. **A case of traumatic paralysis of the sixth, seventh, and eighth nerves with persistent diplopia.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 176-177.

The case of a patient who sustained a fracture of the petrous portion of the left temporal bone in an accident in September 1923 is reported. Hearing on the left side has been affected, patient is unable to close the left eye, the left side of his mouth droops, outward movement of the left globe is limited, and there is a convergent squint of 35 degrees. The case is reported because of the interesting fact of persistent diplopia with good orientation, absence of giddiness, and head-tilting for so many years. Edna M. Reynolds.

Davidson, M. **Siderosis bulbi.** Amer. Jour. Ophth., 1933, v. 16, April, p. 331.

Friede, R. **Removal of nonmagnetic foreign bodies from the vitreous.** Klin. M. f. Augenh., 1933, v. 90, March, p. 368.

Two cases are reported in which the foreign bodies after localization with roentgen rays and direct illumination were extracted through an equatorial incision between ciliary body and ora serrata, the best place for avoiding detachment of the retina. The advantages of equatorial section as against the meridional section near the foreign body as devised by Haab (by which in the second case the foreign body could not have been reached) are emphasized.

C. Zimmermann.

Glover, L. P. **A melanotic sarcoma arising from an area of chorioretinitis.** Amer. Jour. Ophth., 1933, v. 16, April, p. 337.

Gobran, M. **A severe penetrating injury of globe with preservation of shape of eye and retention of some vision.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 178.

A case of an incised wound in the eye of a young woman is reported because of the good cosmetic result obtained and the presence of 1/60 vision. The condition of the uninjured eye remained good during eleven months of observation. Edna M. Reynolds.

Goulden, C., and Stallard, H. B. **Two cases of epithelioma (carcinoma) of the limbus conjunctivae.** Trans. Ophth. Soc., United Kingdom, 1932, v. 52, pp. 47-56.

In one case the growth was small, in the other a ring-form carcinoma completely surrounded the limbus and invaded both fornices.

Thomas D. Allen.

Hoffmann, Rudolf. **Clinical contribution to copper cataract.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 212. (Ill.)

The left eye of a man aged forty-four years was injured in 1918 by explosion of a dynamite cap and after a few days a foreign body was extracted, with total iridectomy. The lens gave a yellow reflex, and the shadow of a splinter was observed in the roentgen photograph. This could not easily be reached and detachment of the retina existed, so no operation was performed. The densest accumulation of copper salts was in the area of the pupil and the coloboma, which corresponds with the view of Jess, whereas Vogt thinks that the copper particles settle where the

iris slides on the lens, at the pupillary ring and under the iris.

C. Zimmermann.

Kiel, Edward. **Invasion of the cornea by aqueous.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 201. (Ill.)

A machinist aged fifty-five years complained of poor sight in his right eye and photophobia for eight days. He remembered striking the eye with his thumb. The upper three-fourths of the cornea was opaque and thickened, and bulged considerably, and the epithelium was stippled. The parenchyma showed fissures and caverns, and there were folds in the endothelium and Descemet's membrane. With formation of blood vessels at the anterior and posterior corneal surfaces the swelling gradually diminished. It was produced from invasion of the cornea by aqueous through lacerations in the endothelium and Descemet's membrane.

C. Zimmermann.

Klauber, E. **Transplantation of corneal epithelium in lime burns.** Oft. Sbornik, 1932, v. 7, pp. 266-268.

In a seventeen-year-old girl, lime denuded the left cornea and part of the conjunctiva of epithelium. After four weeks, the cornea was still denuded and granulation tissue began to grow over it from the upper limbus. A transplant of a small piece of epithelium and superficial parenchyma was made from the right cornea to the lower part of the left. The third day the transplant was firmly adherent, and after eighteen days epithelium covered the lower two-thirds of the cornea, meeting the granulation tissue from above.

G. D. Theobald.

Lloyd, R. I. **Foreign body in eye with negative x-ray report.** Amer. Jour. Ophth., 1933, v. 16, March, p. 237.

Rodin, F. H. **Ocular injuries from air guns.** Amer. Jour Ophth., 1933, v. 16, May, p. 430.

Sabata, J. **Two cases of perforating injury of the eye.** Oft. Sbornik, 1932, v. 7, pp. 291-293.

In a twenty-year-old blacksmith, a metal chip perforated the left eyeball twice and lodged in the orbit. The 3 by 4 by 1 mm. chip was removed with a magnet. The vitreous hemorrhage slowly absorbed; a year later vision was 6/6. In the second case a foreign body was found in an enucleated phthisic eye, having been there thirty years without causing symptoms.

G. D. Theobald.

Schmelzer, Hans. **Eye burn with bichloride of mercury.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 184. (Ill.)

By mistake bichloride of mercury powder instead of calomel was dusted into the only eye of a man aged thirty-five years, for phlyctenular conjunctivitis. The pain was violent, and the eye swelled at once in spite of irrigation with physiological salt solution. On admission to the clinic after about three hours, the chemotic ocular conjunctiva bulged out between the lids and was covered with a whitish eschar, while the peripheral parts of the cornea were slightly hazy. The corneal opacity progressed toward the center. After excision of the destroyed ocular conjunctiva a flap of mucous membrane from the lip was transplanted into the lower nasal area of the eyeball and mucous membrane from the anophthalmic orbit into the upper nasal area. Recovery was complete.

Experimental introduction of bichloride of mercury into one eye of each of seven rabbits produced about the same severe erosion with destruction of the eyeball in every case. Incidentally the conjunctival secretion of the rabbit eyes showed eighty-five percent eosinophilia. The complete recovery of the human patient without leucoma and symblepharon was likely due to the transplantation of mucous membrane.

C. Zimmermann.

Sobhy Bey, M., and Tobgy, A. F. **A case of traumatic rupture of the vitreous.** Bull. Ophth. Soc. Egypt, 1932, v. 25, pp. 179.

A diagnosis of ruptured vitreous was made following slitlamp examination which revealed optically empty spaces similar to the dark areas observed in

degenerated vitreous in high myopia, except that the lines are more rounded and the angles much less sharp than those seen in myopia. (Ill.)

Edna M. Reynolds.

Stastnik, E., and Renc, V. **Bilateral corneal tumors in a twenty-seven-year-old man (fibroma and epithelioma).** Oft. Sbornik, 1932, v. 7, pp. 242-247.

For two weeks a young man aged twenty-seven years had noticed on the front of the left eye a white growth which had a tendency to grow. At the limbus between eight and ten o'clock, was a raised, dirty-milky-colored, half-moon shaped growth which had the appearance of a pseudopterygium. A similar smaller growth was present on the right eye. Histologically, the tumor on the left was epithelioma, and on the right fibroma. G. D. Theobald.

Stepka, Joseph. **Burns of the eye.** Oft. Sbornik, 1932, v. 7, pp. 285-290.

At the Czech Eye Clinic in Prague, during the period of 1919 to 1928, among 179,341 patients, 762 cases of eye burn were treated, 622 in men and 140 in women. The left eye was affected in 290 cases, the right eye in 309 cases, and both eyes in 98 cases. Lime was the source of the burn in 55.4 percent. Other causes were lye, various acids, ammonia, lysol, and silver nitrate.

G. D. Theobald.

Strebel, J. **Ocular burn from bichloride of mercury.** Klin. M. f. Augenh., 1933, v. 90, p. 532.

A very severe burn of conjunctiva and cornea with desquamation of the epithelium and iritis, from erroneous instillation of a very strong solution of bichloride of mercury into an eye twenty days after cataract extraction, is reported. Under irrigations with physiological salt solution, boric acid vaseline, and scarlet red, full recovery with corrected vision of 0.9 to 1.0 occurred within ten days.

C. Zimmermann.

17. SYSTEMIC DISEASES AND PARASITES

Barkan, Hans. **Ocular complications in a case of agranulocytic angina.** Amer. Jour. Ophth., 1933, v. 16, May, p. 406; also Trans. Pacific Coast Oto-Ophth. Soc., 1932, 20th annual meeting, p. 47.

Benedict, W. L. **The relation of infections of the pelvic organs and diseases of the eye.** The Wisconsin Med. Jour., 1933, v. 32, Feb., p. 85.

Benedict again calls the attention of the profession to the relationship between infections of the female pelvis and recurring scleritis and episcleritis. Suitable operations and vaccines have given definite results. The usual organism is a green-producing streptococcus. Foreign protein is of value. (Fourteen case reports and six references.) Ralph W. Danielson.

Hofe, K. **The frequency of eye symptoms, particularly pupillary disturbances, after syphilitic infection.** Zeit. f. Augenh., 1933, v. 79, Feb., p. 511.

Among two hundred individuals who had been infected with syphilis five to thirty-seven years before examination, twenty-five per cent had disturbances of pupillary reaction, three percent changes in the optic nerve, and one and five-tenths percent paralysis of the extraocular muscles. If one compares fifty of these patients who had ocular disturbances with fifty who had normal eyes one finds that the first group contains fourteen untreated patients and the second twelve.

F. Herbert Haessler.

Mills, L., and Martyn, G. **Urinary proteose in ocular allergy.** Trans. Sect. on Ophth. Amer. Med. Assoc., 1932, p. 83.

The authors discuss the biochemical and functional unity of the body, the functions of the liver, the nature of allergy, histamin in allergy, the relation of urinary proteose to the antigen-antibody reaction, general and specific proteose treatment. Autogenous urinary proteose was used in forty-four cases of disabling chronic ocular disease of obscure origin, ten of which are reported. The clinical improvement which followed in forty-one of the forty-four cases is considered evidence of the allergic origins of such condition. The ocular reactions resulting from a rela-

tively excessive dosage of autogenous urinary proteose in these cases are in the authors' opinion conclusive evidence of specificity of this proteose. The degree of improvement in these extreme cases of ocular disease justifies extension of the investigation to ocular diseases of otherwise undeterminable origin, but known to be progressive in type at their earliest recognizable stages. (Discussion.) George H. Stine.

Santonastaso, A. **Ocular changes in leprosy.** Ann. di Ottal., 1932, v. 60, Nov., p. 796.

This is a continuation of the extensive work which the author has done on this subject. The present article treats of the histopathology involved. It may not be profitably abstracted. It is excellently illustrated by numerous plates. Park Lewis.

Saunders, G. **A report on blindness in Wa and Tumu districts, Gold Coast, West Africa.** Jour. Tropical Med. and Hygiene, 1933, v. 36, Jan. 2, p. 5.

Saunders describes several forms of eye trouble which appear from the description to be glaucoma, iritis, and pterygium. The natives believe that their cases of blindness are in some way associated with nodules in the scalp due to a worm known as Onchocerca volvulus. Ralph W. Danielson.

Strebel, J. **Genesis and therapy of scintillating scotoma.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 192.

During his hay fever studies the author became acquainted with a family in which the daughter aged twenty years had hay fever with severe asthma, the mother still suffered from scintillating scotoma and migraine and the maternal grandmother developed urticaria after eating strawberries. The great grandmother had had gout. He interprets these conditions as supporting the relationship of migraine and scintillating scotoma to allergy. A powder of luminol 0.2, pyramidon 0.3 gm. is superior to nitrites and in all cases of severe scintillating attacks has proved very satisfactory. C. Zimmermann.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Bahn, C. A. **The eyes of some famous historical characters.** Amer. Jour. Ophth., 1933, v. 16, May, p. 425.

Barkan, Hans. **Highways and byways in ophthalmology.** Am. Coll. of Surgeons, 1932, v. 16, Dec., p. 54.

The author discusses references to the eye in literature, art, mythology, the records of historical characters, and the Bible. The ocular defects of famous men are discussed and diagnoses are made from histories and old photographs. M. E. Marcove.

Berens, Conrad. **International visual standards for aviators.** Amer. Jour. Ophth., 1933, v. 16, May, p. 403.

Eggston, A. A. **A new method of mounting eyes and other small museum specimens.** Jour. Lab. and Clin. Med., 1933, v. 18, Jan., p. 425.

A method is described which has the advantage of keeping natural color, allowing rough handling, and preventing deterioration. Name of dealer for material is given.

Ralph W. Danielson.

Friedenwald, Harry. **The progress of ophthalmology.** Sect. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 17-32. (See Amer. Jour. Ophth., 1933, v. 16, Jan., p. 93.)

Jackson, Edward. **School clinics.** Amer. Jour. Ophth., 1933, v. 16, April, p. 298.

Jackson, Edward. **Vision for equilibrium and orientation.** Amer. Jour. Ophth., 1933, v. 16, May, p. 412; also Trans. Pacific Coast Oto-Ophth. Soc., 1932, 20th annual meeting, p. 15.

Johnson, J. L. **On the insurance value of one or both eyes or limbs.** South African Med. Jour., 1932, v. 6, Dec. 10, p. 770.

Johnson urges that the custom in England of paying 375 pounds for the loss of one eye and 750 pounds for the loss of both eyes is very unfair, since in many occupations loss of one eye affects ability to work very little and loss

is overpaid, while loss of both eyes brings the earning power to nil. In the latter case the author believes the employee should receive an annuity of half the earning wages of the claimant at the time of the accident, which in most instances would be much more than the present rate. The amount paid for the loss of one eye should also depend on whether or not the employee will be able to hold his position afterward. In South Africa the rates are 500 pounds for one eye and 1,000 pounds for both eyes. Ralph W. Danielson.

Norrie, Gordon. **Causes of blindness.** Hospitalstidende, v. 75, 1933, Feb. 9, pp. 141-148.

This is a review of the causes of blindness in patients who had appeared in Danish institutes for the blind during the last thirty years, with recommendations as to possibilities of prevention. The report is similar to one given in 1927 which covered a 25-year period, of which report is to be found in Acta Ophthalmologica, v. 5, pp. 357-387, and which is abstracted in the American Journal of Ophthalmology, 1927, v. 11, Sept., p. 763. The present review covers 800 cases compared with 578 in the former. The percentages of the different causations remain quite constant. Some emphasis is placed on xerophthalmia as a cause of blindness. The author has reviewed all his records again and the undoubted cases of xerophthalmia now numbered 116 as compared with 99 in the former report, a similar percentage. There were 28 cases of blindness in acute infectious diseases; pneumonia 9, measles 8, whooping cough 5, other infectious diseases 6. The author believes that malnutrition and lack of vitamin A were at the basis of the blindness in all these cases, and this number is therefore added to the 116, making a total of 144. D. L. Tilderquist.

Wright, R. E. **The ophthalmic hospital at Madras.** Amer. Jour. Ophth., 1933, v. 16, April, p. 308.

19. ANATOMY AND EMBRYOLOGY

Rochon-Duvigneaud, A. **The cameleon and its eye.** Ann. d'Ocul., 1933, v. 170, March, pp. 177-218.

The first chapter covers history and biology and includes a study of the power to change color, by pigmentary migrations in the skin under the direct influence of the spinal cord. In chapter two, the gross anatomy and histology of the eye are carefully described. Chapter three takes up ocular movements and comparative physiology; chapter four the genesis of the animal. The chameleon eye resembles the eye of birds.
H. Rommel Hildreth.

Stern, H. J. **Comparative investigations of the ocular fundi of twins.** Klin. M. f. Augenh., 1933, v. 90, Feb., p. 215. (Ill.)

Stern examined twelve pairs of twins whose eyegrounds were photographed and compared. Their origin from one or two ova was diagnosed according to the clinical anthropological method of Siemens, as to pigmentation of hair, skin, eyes, and so on, and showed nine enzygotic and three fraternal pairs. On account of the irregularity of the veins the examinations were limited to the arteries, disc, and macula. Essential uniformity in the arrangement of the ocular vessels does not exist. In contrast with the blood vessels, which are of mesodermal origin, there was predominant concordance in the ectodermal structures. Shape and size of the disc, color of the fundus, physiological excavation were equal in the corresponding eyes, whether origin was from one or two ova. Examination of the ocular fundus is not an aid to diagnosis as to origin from one or two ova.
C. Zimmermann.

Van Canneyt, J. **Concerning congenital syphilitic lesions of the eye in the hare.** Bull. de la Soc. Belge d'Opht., 1932, no. 65, p. 125.

The author observed the progeny of eight pairs of hares in which at the time of fecundation the females were affected with different ocular manifestations due to Treponema pallidum. He has not been able to demonstrate the syphilitic nature of congenital cataract nor of spontaneous keratitis but considers these two manifestations very suspicious of hereditary syphilis.
J. B. Thomas.

NEWS ITEMS

News items in this issue were received from Drs. A. W. Morse, Butte, Montana, Fredk. L. Wicks, Valley City, North Dakota, and B. E. Failing, Newark, New Jersey.

News items should reach **Dr. Melville Black, 424 Metropolitan Building, Denver,** by the twelfth of the month.

Deaths

Dr. Ray Connor, Detroit, aged fifty-six years, was found dead, April 21st, of heart disease.

Dr. Joseph Priestley Smith, emeritus professor of ophthalmology, University of Birmingham, England, died April 30th, aged eighty-seven years.

Miscellaneous

The Manhattan Eye, Ear, and Throat Hospital, New York, was left $5,000 under the will of the late Norman Henderson.

A complimentary dinner under the auspices of the Chicago Ophthalmological Society was given Dr. William H. Wilder of Chicago on Saturday, June 10, at the Medinah Athletic Club. A distinguished group of ophthalmologists gathered to do him honor.

The Ophthalmological, Rhinological and Otological Society of Richmond, Virginia, has voted to become the Eye, Ear, Nose and Throat Section of the recently reorganized Richmond Academy of Medicine.

The fourth annual Summer Graduate Course in Ophthalmology of the University of Rochester School of Medicine and Dentistry will be held in Rochester, N.Y., July 31-August 4.

The Leslie Dana medal for distinguished service in prevention of blindness was awarded to Dr. William H. Luedde on June 19, in Saint Louis. Mr. Carris of the National Society for the Prevention of Blindness made the presentation address. The ceremony was held in the colorful setting of the lawn of Saint Mary's Hospital which is one of the group of hospitals associated with Saint Louis University, in the ophthalmological department of which, Dr. Luedde is professor. This was the eighth presentation of the medal.

Societies

Included in the program of the eye, ear, nose and throat section of the New Jersey State Medical Society meeting at Atlantic City in June were several papers on the eye. Dr. Bernard Samuels, New York, by invitation, discussed "Perforating wounds of the eye." Drs. R. N. Berke, Hackensack, and V. Earl Johnson, Atlantic City, discussed "The use of the cross cylinder in refraction" and "Avertin rectal narcosis," respectively.

The North Dakota Academy of Ophthalmology and Otolaryngology held its annual election meeting on June first at Valley City, under the presidency of Dr. Axel Oftedal, Fargo. Dr. Henry O. Ruud, Grand Forks, was elected president and Dr. F. L. Wicks, Valley City, re-elected secretary. The autumn meeting of the Academy will be held in connection with the South Dakota Society at Rochester, Minnesota, upon invitation of the Mayo Clinic.

Personals

Prof. August Wagenmann, occupant of the chair of ophthalmology at the University of Heidelberg, celebrated his seventieth birthday anniversary on April fifth.

Dr. Alfred Vogt, professor of ophthalmology, University of Zurich, Switzerland, has recently been elected to honorary fellowship in the New York Academy of Medicine.

The Hungarian Ophthalmological Society has recently named the following American physicians to honorary membership: Drs. Harvey Cushing, Boston; George E. de Schweinitz, Philadelphia; Edward V. L. Brown; and William H. Wilder, Chicago.

Dr. D. K. Worden has moved from Butte to Lewiston, Montana, to practice his specialty of eye, ear, nose and throat.

Dr. Robert H. Courtney, Richmond, has been promoted to associate professor of ophthalmology at the Medical College of Virginia.

Drs. Maurice E. Marcove and Ralph W. Danielson have been appointed instructors in ophthalmology at the University of Colorado School of Medicine.

Dr. Eugene R. Lewis, as guest of the Dallas Academy of Ophthalmology and Otolaryngology, May 2, conducted an eye clinic and presented a paper on "Physical and chemical aspects of glaucoma and progressive deafness."

Dr. Lawrence T. Post has been appointed head of the department of ophthalmology of Washington University in St. Louis, effective July first. The appointment is on a part time basis.